THE DENTAL PRACTITIONER

AND DENTAL RECORD

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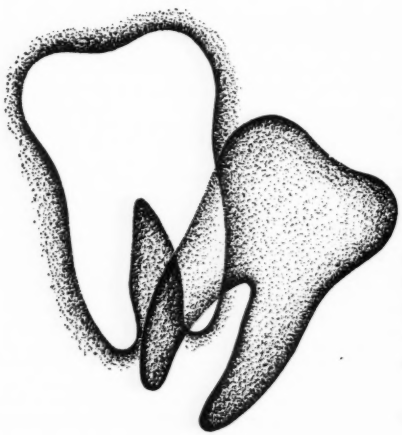

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THE DENTAL PRACTITIONER AND DENTAL RECORD

Vol. IX, No. 5 January, 1959

EDITORIAL

LETTER FROM THE EDITOR

It is nearly eight years since I had the honour to be appointed Editor to the Dental Practitioner. Although I have been associated with the Journal since its inception, it is with sincere regret that I now find that I must tender my resignation and leave the future of the Journal mainly to others. In saying this I should add that I hope still to be of service to the Publishers and the Editorial Board, for after so long a time the Journal has become part of my life and a complete divorce would be unthinkable.

To guide its fortunes over the years has meant many hours of concentration, but the success of the Journal has repaid me a thousand times. There have, of course, been many moments of despair, but equally, there have been moments of elation. The trials and tribulations of reading and rejecting have been more than balanced by the acceptance of really good material. The heartaches of writing an editorial every month now seem less of a penance, for, having written ninety-six of them, I feel it has all been worth while.

However, the Journal is not made or run by an editor, and it would be wrong to suggest that I have played a greater part than many others in the success of this Journal. I have not walked alone throughout these years and I must record my thanks to the very many people associated with this publication, who have helped to raise it from its humble beginnings to a Journal with a world-wide reputation. To my many colleagues on the Editorial Board, to those associated with the British Society for the Study of Orthodontics, the British Society of Periodontology, and last, but not least, to the Directors of John Wright & Sons Ltd., I can only say "Thank you" and wish the new editor and the Dental Practitioner many more years of successful publication.

N. Livingstone Ward

Note.—Mr. Livingstone Ward has been appointed Dental Sub-Dean at The London Hospital Medical College in succession to Mr. A. M. Horsnell, who has been appointed Professor of Dental Science at the University of Adelaide, Australia.

CLINICAL MANAGEMENT OF PERIODONTAL DISEASE*

By **JOHN ANTON KOLLAR, jun.**, D.D.S.
Assistant Professor of Periodontics, Loyola University School of Dentistry, Chicago, Ill., U.S.A.

THE objective of dentistry is a health service; therefore, it is essential that we, as members of the dental profession, realize fully the prevalence of periodontal disease, if we are to fulfil the obligation we owe to our patients. The diseases that affect the periodontium are among the most common causes of the loss of the natural dentition. Basically, the periodontal disease process results in destruction of the periodontal tissues that support the teeth, causing changes in occlusion and migration of the teeth and ultimately loss of the dentition. This process affects adults as well as children. Analysis of the numerous surveys made in recent years on the prevalence of peridontal disease shows statistically that over 75 per cent of the population have some form of inflammatory gingival disease, and that there is a sharp rise in the incidence of chronic destructive disease of the periodontium after the age of 30. There have been significant advances made in the diagnosis and treatment of periodontal disease since the time of Riggs, in 1869. However, to-day, in the minds of the average layman and too many members of the dental profession, the impression and confusion exist that periodontal disease is incurable, and teeth must be lost when such a condition occurs. This attitude stems from ignorance of the biologic principles that are based on research and histologic fact, as well as clinical evidence that shows the disease is curable and may be prevented before serious damage occurs in the supporting tissues; this erroneous belief constitutes a challenge to us in the realm of professional and patient education.

Too often, periodontal disease goes undetected or neglected until it is in an advanced state, before measures are taken to begin treatment. Because the disease is painless, the patient is usually unaware of a periodontal problem until the disease begins to reach its terminal stage. This will result in loosening of the teeth and pathologic migration, which causes discomfort when the dentition and supporting tissues are subjected to functional demands. The only early symptom of which the patient may be aware is occasional bleeding that occurs when brushing the teeth.

The failure to recognize the disease process lies, almost exclusively, with the dental profession. In order to prevent the inroads of disease in its earliest stages, recognition is essential. In the clinical diagnosis and prevention of periodontal disease, certain basic procedures must be followed, and in order to correlate these procedures the dentist must approach the problem of diagnosis from a biologic basis. This will necessitate the proper use of his knowledge of the histopathology of the supporting tissues of the teeth and their interrelation with other organs and functions of the body, and the basic mechanical principles used in the design and construction of individual dental restorative procedures.

Clinically, the technique in detecting early periodontal involvement depends upon careful thorough examination of the periodontium and correlation of roentgenographic findings, and an understanding of the clinical biologic difference between normal supporting tissues and gingiva and how these tissues react when subjected to a disease process. In some involved periodontal cases laboratory studies may have to be made and correlated to the clinical findings.

Basically, the aetiology of periodontal diseases may be grouped under five headings:—

1. Local irritational factors, physical and bacterial, leading to inflammatory reaction.
2. Systemic factors.
3. Disturbances in function.
4. Hereditary predisposition.

* Presented before the 1958 Annual Meeting of the American Dental Society of Europe in Knokke, Belgium, July, 1958.

5. Factors of unknown aetiology.

The normal gingival tissues may be divided into free gingiva and the attached gingiva, these parts being separated by the free gingival groove. The attached gingiva is stippled because of its attachment to the underlying connective tissue and the functional adaptation of the tissues to mechanical and abrasive stimulus during mastication, etc. Apical of the attached gingiva is a scalloped line which separates the gingiva from the alveolar mucosa. This tissue is thin and loosely attached to the underlying periosteum, and unlike the attached gingiva, it is not stippled; the epithelium is very thin and is on a base of loose connective tissue. The interdental papilla is the tissue that fills the space between the teeth, and is made of both free and attached gingival tissues. Clinically, the normal gingiva is pale pink, the gingival sulcus is 1–2 mm. in depth, and the papillary contour is pointed and presents a closely adapted marginal gingiva with a knife-like edge. The attached gingiva is of a firm consistency and stippled; in contrast to the pale pink of the attached gingiva, the alveolar mucosa is dark red in colour.

The reaction of the papillary and marginal gingiva to local inflammation is the most common cause of its clinical alteration from the normal colour and structure. This tissue reaction is due to mechanical and bacterial irritation. The inflammation that occurs may be acute or chronic. Changes take place in the normal pale pink colour of the tissue; this is usually seen in the interdental papilla and is the first visible sign of periodontal breakdown. These changes in colour are a definite factor in early diagnosis as the inflammation causes changes in the circulatory system of the tissue involved. The circulatory disturbance results in deviation from normal colouring and may vary from various shades of red to a purplish magenta colour. Other early clinical manifestations of inflammatory reactions in gingival tissues are œdema and changes in the consistency of the papillary and marginal gingiva. This is accompanied by a gradual loss of stippling and texture as the inflammation spreads toward the attached gingiva. Close examination of the gingival sulcus will reveal an increased depth beyond the normal 1–2 mm. Some of the increased depth can be attributed to œdema of the tissue in the early stages of inflammation. However, prolonged inflammation will bring about apical migration of the epithelial attachment and beginning destruction of the alveolar crest, and loss of periodontal ligament and gradual pocket formation. This phenomenon may be accompanied by hæmorrhagic tissue exudate due to ulceration of the epithelium lining the pocket and exposure of the swollen capillary bed.

Clinical examination as to pocket depth is accomplished by the use of a No. 17 explorer or pocket measure. Calculus deposits are usually present extending to the bottom of the pocket and there is an exudate, either purulent, hæmorrhagic, or serous, depending upon the duration of the disease, virulence of bacterial activity, and the condition of the epithelial lining of the pocket. Any mobility or migration of the teeth is the result of loss of bone and is an indication of advanced periodontitis or periodontosis.

In the examination of the patient, determination of the diagnosis must be based on oral and roentgenographic findings. Good roentgenographs are important in this respect. Where the alveolar bone is normal, the outline of the crest of the alveolar process is determined by the position of the dento-enamel junction, and a lamina dura is intact completely around the outline of the root. The normal functional outline of the alveolar crest is altered by disease and may undergo resorption. As a result of periodontitis a typical cup-shaped crest is found; in degenerative disease, vertical resorption will show in the roentgenographs. This is typical of a periodontosis and is a result of resorption from the periodontal space into the alveolar cortical plate of bone. Traumatic bone changes and alterations in the width of the periodontal ligament space occur in diseases, as well as root resorption and changes in bone trabeculation. Roentgenographs also give information as to functional stimuli in regard to bone structure. Pocket depth may be ascertained by radiographic means through the use of gutta percha or silver points inserted into the pocket before the picture is taken.

In order to classify the disease affecting the periodontium, the pathology of tissue reaction, aetiology, and clinical manifestations of the disease process must be considered. These diseases have been classified in many ways; essentially, however, they are grouped under the following headings:—

1. Inflammatory.
2. Dystrophic: (*a*) Degenerative; (*b*) Atrophic; (*c*) Hyperplastic.
3. Traumatic.

The inflammatory diseases are of primary concern as they are the most common and occur in one form or another in over 75 per cent of the patients seen for routine dental treatment. These inflammatory reactions of the gingiva are caused by poor oral hygiene, poorly made and adapted restorations leading to food and bacterial accumulations and, most important, deposits of supra- and submarginal calculus. The technique of prevention, therefore, concerns itself primarily with the elimination of these local irritating factors.

Clinically, scaling and root planing constitutes the most valuable technique in the prevention and control of periodontal disease. Contrary to popular belief among the members of the dental profession, it is the most difficult of all dental operations—perfection is essential and can be carried out only through continuous and meticulous practice. It must be realized that it is the submarginal calculus deposits that occupy the entire pocket space, and its apical end extends to the very bottom of the pockets—all around the tooth—in fact, around all of the teeth. The complex and complete removal of all deposits to the bottom of the pockets around all the teeth constitutes a major technical problem. From a purely mechanical viewpoint, the instruments used in scaling and root planing must be well adapted for good functional removal of calculus deposits and minimum trauma to the soft tissue wall of the pocket.

The instruments used in therapeutic root planing should be sharp and well balanced, with a working end small enough to fit into the bottom of the pocket area. Instruments best suited for root planing, in order of their use, are: (1) Hoes; (2) Sickles; (3) Chisels; (4) Files; (5) Curettes.

Hoe- and sickle-shaped instruments are to be used essentially for the removal of the bulk of supramarginal and submarginal calculus. The files and curettes are used for the removal of the deposits at the bottom of the pockets and planing the surface of the root smooth. The chisel is mostly useful in the anterior area in removal of supramarginal calculus. It is important to remember that the instrument must be held in a firm grip, and extensive use should be made of the third and middle fingers; the non-operating hand acts as additional support, to obtain different resting positions. Because slipping of the instruments causes discomfort as well as damage to the soft tissues, it is important to emphasize again that sharp instruments are essential, and they should be used with as little force as possible and the fewest possible number of strokes. This will reduce soft tissue damage and prevent gouging of the root surfaces.

The procedure in removal should follow a definite sequence. The area to be scaled should be clean as far as soft food deposits and materia alba are concerned. At this time it is necessary to use a prophylactic paste and a rubber cup in a handpiece and remove all soft deposits to clear the field of operation. In most instances it is necessary and advisable to use some type of topical anæsthetic on the area to be worked on. If the root surfaces are too sensitive, it may be advisable to use a local anæsthetic, either block or infiltration, or inhalation analgesic.

The next step is use of an explorer, No. 17, to probe the depth of pockets by placing the instrument against the tooth surface. Any roughness or irregularities as the instrument slides to the bottom of the pocket will have to be removed. The type of instrument to be used in such an area depends upon the size and depth of the pocket and the amount of deposit. Usually the hoe-type instrument is used first to remove the gross deposit, followed at the same time or at subsequent appointments by use of fine files and curettes to produce a smooth surface, free of both calculus and cementum.

Final finish is accomplished by the use of silex or fine prophylaxis paste and an engine-driven rubber cup. It is advisable to use stimudents or porte polishers along with the paste to obtain a fine polish in the interproximal areas. In areas where the interproximal space is limited, the use of dental tape and polish powder or paste is indicated. If the areas are rough, it may be necessary to use a fine linen or cuttle strip.

It is upon completion of this phase of treatment that surgical procedures may be carried out, if they are indicated.

Inflammation plays a most important role in the healing of wounds. A clean-cut wound may heal by first intention if the lips of the wound are closely approximated, e.g., by suture. The first reaction is extravasculation of blood-plasma, which clots, and the formed fibrin achieves a temporary closing of the wound. Into the fibrin migrate undifferentiated mesenchymal cells, followed by proliferating capillaries. By production of new fibres, a permanent closing of the wound is effected. During this time the epithelium bridges the gap. The connective tissue changes slowly to a very dense scar tissue. If there is no immediate contact of the wound lips, or if there is a larger surface defect, or after the healing of wound infection, repair by second intention follows. In the oral cavity, healing by second intention is always accompanied by "infection" because of the presence of bacteria—these bacteria, however, are not highly pathogenic. Necrosis of surface tissue occurs, which later sloughs off, and young connective tissue proliferates from the wound surface. This is characterized by being rich in cells and blood-vessels and poor in fibres. This granulation tissue may sometimes show exuberant growth—"proud flesh". The epithelium proliferates slowly over the wound surface, the epithelial cells gliding in a peculiar movement along the surface connective tissue. This physiologic phenomenon must be borne in mind when we discuss the surgical phase of periodontal treatment.

It must be remembered that periodontal surgery is no more than a phase in the treatment of a periodontal case. This method of eliminating the periodontal pocket is to be used only if it is indicated, and should not be regarded as a cure-all.

The primary aim in the treatment of severe periodontal disease is to eliminate the gingival pocket. Surgical gingivectomy is the most direct and simplest method of achieving this purpose.

Essentially, the tissue to be removed by the surgeon is that which forms the soft wall of the pocket. Conservative surgery must be practised in order to preserve bone structure. In other words, bone or soft tissue is not removed below the bottom of the gingival pocket, with the incision at a slight bevel in an apical direction toward the attached gingiva. Post-surgically, we may, therefore, expect a certain amount of bone regeneration and restoration of the cortical plate of bone and the alveolar crest.

Certain basic rules must be followed in the technique of gingivectomy:—

1. Zinc oxide or surgical dressing is placed upon the wound surface and left in place 3–4 days.

2. After 3–4 days the dressing is removed. The wound surface is débrided by the use of 30 per cent trichloracetic acid.

3. The surgical dressing is replaced.

4. This procedure is followed at 3–5 day intervals until the wound surface is epithelialized.

5. Continued scaling is carried out each time the dressing is changed.

6. Home care procedures are to be instituted as soon as the surface is covered with epithelium.

7. Clinical stimulation may be accomplished by use of superoxol (30 per cent H_2O_2). This solution is acid, and is neutralized before use by adding one drop of 5 per cent bicarbonate of soda to ten drops of superoxol.

The tissue catalase causes the liberation of oxygen from the peroxide solution. The newly-formed oxygen penetrates through the epithelium, forming innumerable bubbles. In its application by cotton-pellet, the tissue turns white, due to blanching. The blanching is due to compression of the tissue and capillaries by the penetration of the many oxygen bubbles.

The whiteness disappears in 10–15 minutes. This stimulation causes degeneration of the plasma-cells and resolution of the inflammation present. At the same time the number of eosinophils shows a marked increase, the tissue becomes fibrous in character, and the epithelium thickens.

This treatment should be rendered to the healing tissues twice a week for a period of 3–5 weeks.

There are many surgical procedures that can be used to eliminate a periodontal pocket; some are radical in nature and involve removal of bone, while others constitute flap type or plastic surgery.

Basically, we may classify surgical procedures in periodontal therapy as follows:—

1. Surgery of the gingiva (soft tissue): (*a*) Curettage; (*b*) Gingivectomy; (*c*) Gingivoplasty; (*d*) Papillectomy; (*e*) Establishing drainage for acute abscess (incision).

2. Osseous surgery: (*a*) Infra-osseous flap; (*b*) Osteoectomy; (*c*) Osteoplasty; (*d*) Root amputation.

3. Surgery for alveolar mucosa (surgery in problems of the muco-gingival junction): (*a*) Fornix extension; (*b*) Frenulotomy; (*c*) Establishing drainage for periodontal abscess; (*d*) Gingival extension; (*e*) Sliding gingival flap.

Diseases grouped under the heading of dystrophic periodontal diseases are far beyond the preventive phases, as far as periodontal disease is concerned. Here, extensive damage has occurred to the supporting structures, and deep pockets are present, or extensive tissue hyperplasia exists. Corrective measures in these instances require extensive surgical procedures and post-operative treatment. In cases where pathologic migration has occurred, teeth must be repositioned with the use of active removable orthodontic appliances. If extensive damage has occurred, even the physiologic requirements of normal function will subject the tissues to too much stress. Splinting of the dentition then may be indicated, or full mouth reconstruction may be necessary in order to have again a good functional masticatory organ. If bridge work is necessary, it should aim to relieve rather than burden the supporting structures.

Numerous systemic factors alter the normal body chemistry; some examples being anæmia, diabetes, pregnancy, glandular imbalances, liver and kidney disorders, etc. These are aggravating factors contributing to a periodontal condition already present; the infection in periodontal disease can also be an aggravating factor in a systemic disease process in the body and affect the general health of the patient, producing headaches, malaise, poor appetite, etc.

There is much scientific evidence which points to deficient nutrition as a contributing factor in the development of periodontal disease or unfavourable response of tissues to treatment. Some of the different phases of nutrition that may contribute to the disease process are:—

1. Inadequate or unbalanced diet.

2. Inability of the system to absorb or assimilate the nutrients of food.

3. Environmental conditions affecting the types of food ingested.

These nutritional factors may lead to a lessened resistance of the supporting tissues to the disease process.

Traumatic tissue changes are entirely specific. They are neither inflammatory nor dystrophic.

Traumatic tissue changes, known as "traumatism", are characterized by changes due to stresses which are beyond the physiologic tissue tolerance. These tissue changes on the side of excessive tension are: Overstress of the fibrous elements of the periodontal ligament, leading to disturbances in the collagenous fibre bundles of the principal fibres; damage to the capillaries in the periodontal ligament, accompanied sometimes by hæmorrhage and thrombosis. On the side of pressure, the tissue changes are necrosis of the compressed connective tissue, hæmorrhage, thrombosis, resorption of bone and often, of cementum. These tissue changes are very well known in experimental animals as well as human autopsy and biopsy material.

What role does occlusal trauma, or do occlusal disharmonies play, in periodontal health and disease? Does occlusal trauma of any kind produce gingivitis, periodontitis,

periodontosis, recession of the gingiva, or hyperplasia? The answer to this question is an uncompromising "No". In periodontal diseases of any type, occlusal trauma plays a secondary aggravating role, but not a primary aetiologic one. No occlusal trauma produces a gingivitis, pocket formation, or recession. All these periodontal disturbances are aggravated by the occlusal factor. A harmonious, good functional occlusion is essential for good tissue health. Function and tissue structure are two closely interrelated factors. One does not and cannot exist without the other. All the organs in our bodies are built according to functional specifications, and it is only too well known that good functional activity is needed to maintain good tissue health.

The idea anchored in the minds of so many dentists that occlusal trauma is a primary aetiologic factor in producing periodontal disease is absolutely false, and has hampered the proper understanding of this disease by the general practitioner for many years.

If anyone claims—and it has been done—that he has cured periodontal disease such as gingivitis, periodontitis, periodontosis, recession, hyperplasia of any type, by grinding the occlusion, by reconstructing the bite, by producing bite-plates of any type, he is not telling the truth; he is prejudiced and ignorant of histologic fact.

No gingivitis, which is due to local irritation, can be prevented (or cured) by occlusal adjustment of any type, and no pocket can be eliminated or its formation prevented and the flow of pus stopped by any measure of occlusal adjustment.

The problem of prevention of periodontal disease is recognition, and preventive procedures are essentially conservative. They should consist of local therapy, removal of all calculus, and the building of a suitable functionally adapted environment as far as restorative dentistry is concerned; contour, contact, polish, occlusion, and margins of restorations should be considered as well as instituting thorough periodontal procedures to be carried out by the patient.

Definite appointments must be set aside for the express purpose of home care instruction—procedures which will vary in their application and technique for each individual case. Proper use of the toothbrush helps maintain good oral hygiene and prevents tissue inflammation from food and materia alba deposits. It also eliminates much possible calculus formation and will reduce the incidence of dental caries. Additional aids in the home care procedure are essential for the maintenance of interproximal tissue.

Mechanical massaging of the tissue (by the use of rubber tips, toothpicks) and the use of dental tape serve as a stimulus to tissue as well as an aid to elimination of food deposit. Continuous instruction in home care technique is necessary as well as periodic recalls and periodontal root planing.

Patients have to remain under observation as long as they have their teeth, because even the best home care will not completely prevent formation of calculus. Regular recall of periodontal patients is an important preventive measure and the big problem is maintenance of a good therapeutic result by constant care.

A successful periodontal therapy has to be based upon the following:—

1. Proper knowledge of the biology and physiology of the supporting tissues.
2. Proper diagnosis.
3. Thorough planning of the different phases of therapy.
4. Proper judgement of the prognosis.
5. Ability and willingness of the patient to carry out the home treatment.
6. Willingness of the patient to return for maintenance and therapy.

[Periodontics is the basis of good dentistry. Without good dentistry, periodontal therapy cannot succeed!]

Cephalometrics in the Atomic Age

The construction of limiting diaphragms for use in cephalometric radiography is described. A small primary diaphragm near the source of X rays offers increased protection to the operator. A larger secondary diaphragm could be used near the patient.—COHEN, M. I., and HAMMOND, E. (1957), *Amer. J. Orthodont.*, **43**, 492.

NITROUS OXIDE - ETHER - CHLOROFORM

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EVEN a cursory study of history reveals that the dental profession has a proud heritage, due to pioneers whose names must never be allowed to lapse into oblivion.

This brief article is, however, restricted to the roles played by four of its members in the early days of general anæsthesia, to wit:

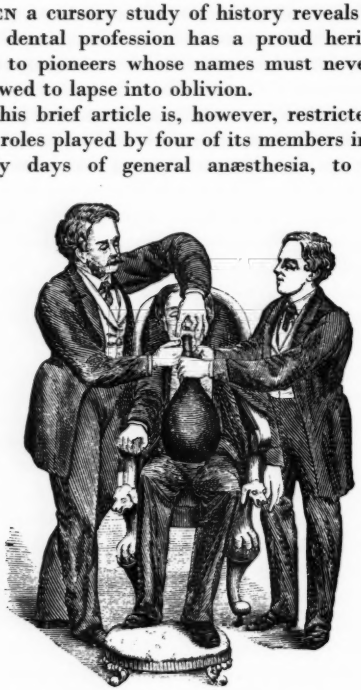

Fig. 1.—An early administration of nitrous oxide. (*From "Manual of the Discovery, Manufacture, and Administration of Nitrous Oxide", by F. R. Thomas,* 1870.)

Horace H. Wells (1815–48), William Thomas Green Morton (1819–68), James Robinson (1813–62), and Francis Brodie Imlach (1819–91).

Horace Wells was a practising dentist in Hartford, Connecticut. On Dec. 10, 1844, he was present at a public entertainment on the exhilarating effects of nitrous oxide, administered by Gardner Q. Colton, an itinerant lecturer on popular science. From what he then witnessed, Wells was convinced that this particular vapour could eliminate pain in surgical operations.

Consequently, he arranged with Colton to bring the gas, and the apparatus for administering it, to his consulting-rooms the following morning at 10 o'clock. In order to convince himself of its reliability, Wells decided to have one of his own teeth extracted by John M. Riggs (of "Riggs's Disease" fame) in the presence of a few friends. With Colton's assistance and at considerable personal risk, he inhaled nitrous oxide to the stage of entire insensibility—never before attempted. The extraction was performed painlessly, and he made a prompt and satisfactory recovery.

Wells was very impressed, and enthusiastically continued to experiment with nitrous oxide, aiming at improving not only its purity, but also the technique of administration. In consequence, his reputation as a painless dentist became so widespread that his practice was thronged by sufferers from dental diseases.

He did not attempt to keep his discovery secret; on the contrary, he was most anxious to make it universally known. He realized that in order to achieve this, he must, without delay, proceed to Boston and demonstrate it before a professional audience.

His first call was on W. T. G. Morton and C. T. Jackson, who introduced him to J. C. Warren, a surgeon attached to the Massachusetts General Hospital.

As an outcome, it was arranged for Wells, in January, 1845, in the presence of members of the hospital staff and students, to explain his discovery, anæsthetize a patient with nitrous oxide, and then extract one of his teeth. This triple performance would have proved onerous for even a placid person, but more so for one endowed with Wells's shy, nervous, and retiring temperament. The operation proved unsuccessful; the patient (a medical student) groaned and complained that he had experienced considerable pain. One report suggested that, in his excitement, Wells

removed the gas-bag prematurely; another, that the patient was an unduly difficult subject.

Be all that as it may, Wells was ridiculed and so chagrined that next morning he returned to Hartford. There he resumed his dental practice and continued for a time experimenting with various vapours for producing general anæsthesia. However, comparatively soon, due to ill-health, he abandoned everything. Tragic to relate, his mind became deranged, and on January 24, 1848, he (then insolvent) committed suicide. Nevertheless, it is rightfully accepted that the altruistic Wells was the discoverer of the anæsthetic properties of nitrous oxide.

William Thomas Green Morton practised as a dentist in Boston. Previously, he had been a pupil-boarder with C. T. Jackson (1805–80), a physician, who possessed a profound knowledge of chemistry and was very interested in ether. Further, Morton had earlier been closely associated with Horace Wells, first as an apprentice and later in a brief partnership. Like him, he was certainly aware of the "ether frolics" and nitrous oxide parties which were popular pastimes in certain parts of America.

From his early experiments, Morton erroneously imagined that the air expired by a person who had inhaled ether vapour was combustible. Having overcome this misconception, he was not averse from administering it freely to his patients in order to eliminate the pain resulting from dental extractions.

In fact, he used ether in very many cases. He noted that, when the initial irritation subsided, there was complete unconsciousness and the patient was tranquil. Nevertheless, he declined to administer it to children because nausea and vomiting invariably ensued.

Eventually, like Wells with nitrous oxide, he persuaded J. C. Warren to permit him to demonstrate the anæsthetic effects on a patient in Massachusetts General Hospital. This he did on Oct. 16, 1846, administering it to the point of intoxication from an apparatus which he had devised, and which contained a sponge saturated in the solution.

The operation was for the removal of a tumour, and was performed by J. C. Warren; it involved an incision several inches in extent below the left side of the mandible. On regaining consciousness, the patient declared that, although pain was not entirely absent, he likened the stroke of the knife to a blunt instrument being passed roughly over his neck. Any shortcomings on Morton's part can readily be attributed to the prevailing tense atmosphere—the importance of the occasion and an audience comprising a preponderance of professional sceptics.

This was the first authenticated time that ether was successfully used as a general anæsthetic. It is, therefore, not surprising that Warren felt justified in turning to his audience and exclaiming: "Gentlemen, this is no humbug."

On the following day, in the same hospital, with Morton again acting as anæsthetist, George Hayward removed an adipose tumour from a woman's arm. The administration on this occasion was entirely successful, the patient being insensible throughout the operation.

Unlike Wells, Morton was, from the outset, determined to commercialize his discovery. From contemporary reports, he appears to have lacked both culture and idealism, his outlook being decidedly practical and inventive. He did not, therefore, delay exploiting his product (actually disguised ether) under the mystic name, *Letheon*, suggested to him as being appropriate by A. A. Gould, a well-known Boston medical practitioner and scientist. This word is, of course, derived from *Lethe*—in Greek mythology the river in Hades which must be tasted by the souls of the departed to ensure that they forget everything said or done on earth.

Nevertheless, it is most unfortunate that such a momentous discovery should have resulted in acrimonious controversy with, among others, C. T. Jackson (for the last seven years of his life confined in a lunatic asylum), who resolutely disputed Morton's claim to priority. This led to a widespread antagonism to Morton, who suffered years of frustration and continuous worry. Doubtless,

these were responsible for the apoplectic seizure, which caused this somewhat misguided benefactor's untimely death in dire poverty, at the age of 49.

James Robinson, who practised in Gower Street, London, had an international reputation, being one of the best known dentists of his time. He was, on Dec. 19, 1846, the first person to perform an operation in Great Britain under the anæsthetic influence of ether, administered by Francis Boott, a physician. He extracted a firmly implanted tooth for a lady, who stated afterwards that she had not experienced any pain, instead "a heavenly dream". The entire proceedings—inhalation, extraction, and regaining consciousness—occupied three minutes.

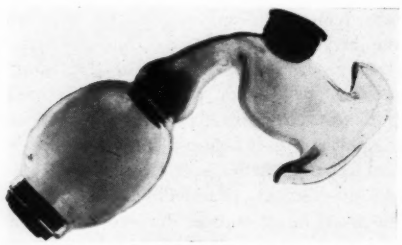

Fig. 3.—Stevenson's ether inhaler with two automatic brass valves—one for inspiration, the other for expiration. Registered Feb. 18, 1847. (*In the collection of the writer.*)

Further, on Dec. 31, 1846, Robinson successfully etherized a patient in King's College Hospital, London, for a surgical operation performed by Professor William Fergusson.

Robinson had devised the ether inhaler which was used on these occasions, and which Mr. Hooper, of Pall Mall, had constructed in accordance with his specifications (*Fig.* 2). This is believed to have been first marketed on Jan. 10, 1847. Although Boott's name is closely associated with it, nevertheless

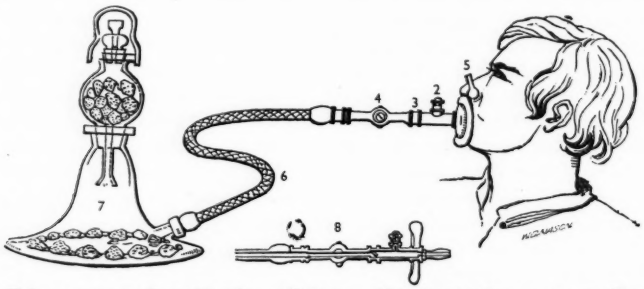

Fig. 2.—Ether apparatus devised by James Robinson. (For detailed description, *see The Lancet*, Jan. 16, 1847.)

Robinson stated that it was his own invention. Far from controverting this, *The Lancet* commended Robinson for refusing to derive any profit, whatsoever, from its sale. This apparatus was soon followed by a tide of others, for instance Stevenson's, which was specially suitable for dental use (*Fig.* 3).

Robinson achieved considerably more than this. He continued to conduct experiments and tests aimed at producing ether which would be perfectly pure, highly volatile, and of the minimum specific gravity. Also, early in 1847, he published a most instructive work on ether (reviewed in *The Lancet*, March 13).

James Robinson, when aged forty-nine, died under tragic circumstances. While walking in his garden at Harrow on March 2, 1862, he espied a stray shoot on a shrub and attempted to prune it. Unfortunately, the knife slipped and penetrated the thigh. Two days later, he succumbed from profuse hæmorrhage from a branch of the femoral artery.

Francis Brodie Imlach, an intimate friend of J. Y. Simpson, was an Edinburgh surgeon who restricted his practice to dentistry, having been trained in this speciality both in Edinburgh and at Paris. He was the first person, early in November, 1847, to extract a tooth under the anæsthetic influence of chloroform

applied on a thin white cotton handkerchief. Incidentally, the patient was one of his apprentices, James Darsie Morrison, who later practised as a surgeon-dentist.

Within nine months Imlach had administered chloroform in upwards of three hundred cases, without a single fatality or accident. Quite a record in these early days! He stated that he attributed his success to the fact that he was insistent on using chloroform only in its purest form.

Imlach died suddenly in the street on the afternoon of Dec. 24, 1891, from angina pectoris, when approaching the Royal College of Surgeons of Edinburgh to attend a meeting.

To Wells, Morton, Robinson, and Imlach, John Hunter's remark aptly applies—"Why think? Why not try the experiment?" They did, and humanity benefited.

(The writer has purposely avoided any unnecessary reference to the bitter controversy, sheer disillusionment, and profound unhappiness which beset the several claimants to the discovery of general anæsthetics.)

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A FIBROUS EPULIS IN A BOY AGED FOUR YEARS

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A SEARCH of the literature has failed to reveal any report of a fibrous epulis occurring in a child below the age of 6 years, or associated with the deciduous dentition. Bernick (1948), in a series of 74 cases, reports 2 fibrous epulides occurring during the first decade, but does not give the actual ages of the children. Stones (1954) records that the youngest child in his series with a fibrous epulis was 9 years of age. Sample and Swanson (1945) state that fibrous

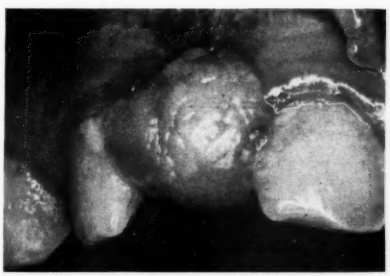

Fig. 1.—Clinical photograph of labial aspect of fibrous epulis situated between $\underline{B|}$ and $\underline{A|}$. ($\times 2\frac{2}{3}$.)

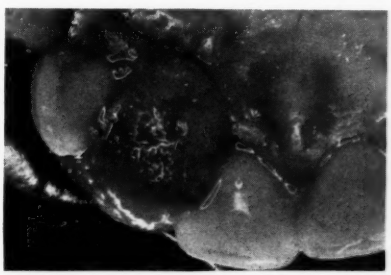

Fig. 2.—Clinical photograph of palatal aspect of fibrous epulis situated between $\underline{B|}$ and $\underline{A|}$. ($\times 2\frac{2}{3}$.)

epulides are never found in children under the age of 6 years.

CASE REPORT

The patient, R. A., a boy of almost 5 years of age, was referred to The London Hospital. The sole complaint was of a lump between his front teeth which was first noticed by his mother one year previously, since when it had grown steadily larger. On examination, he appeared

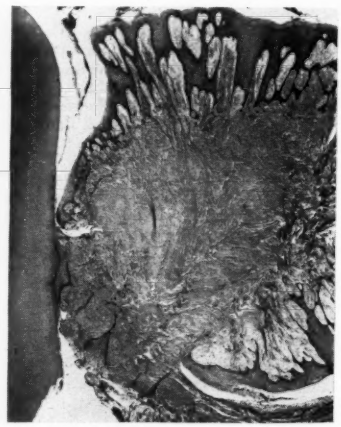

Fig. 3.—A photomicrograph of a section stained with van Gieson's stain. The field illustrates the dense fibrous tissue and absence of inflammatory or giant cells. (× 12.)

to be a healthy child of normal physical development for his age.

Oral examination showed the boy to have a good standard of oral hygiene, and there were only three small occlusal cavities in the molars, while the incisors and canines had no carious lesions. On the gingiva between the B| and A| there was a firm, pink lump, approximately 0·8 cm. in diameter (*Fig.* 1). The base of the tumour was attached to the underlying gingiva and separated the B| and the A| by about 0·5 cm. (*Fig.* 2). Careful clinical examination failed to detect any calculus in the region of the tumour or to detect approximal caries. Radiographs confirmed that there were no approximal cavities in B| or A| and no change in the underlying bone was seen. There was thus no evident source of local irritation. A provisional diagnosis of fibrous epulis or possibly giant cell epulis was made.

Operation.—The child was admitted to hospital, and the tumour, together with a margin of the surrounding healthy gingiva and the B| to which it was attached, were removed under general anæsthesia. The A| was also extracted. A plate was fitted to retain a piece of tulle gras and was subsequently worn as a space maintainer. Post-operative recovery was uneventful. The patient was seen 6 months later when the 1| was starting to erupt and was last seen 12 months after the operation, when there was no sign of a recurrence of the lesion.

Histopathology.—Histological examination showed a mass of fibrous tissue covered with normal gingival epithelium. There were very few inflammatory cells present in the lesion and no giant cells were found (*Fig.* 3). The appearance was consistent with that of a fibrous epulis. The B|, which was attached to the tumour at its cervical margin, had a vital pulp, and physiological resorption of its root had commenced.

DISCUSSION

It is of interest that, although the tumour was not noticed until the boy was nearly 4 years of age, that is, some time after the eruption of the primary dentition was complete, it had exerted sufficient pressure to separate his upper incisors by 0·5 cm., without perceptibly altering the shape of the dental arch. It is not possible to be certain as to how this space had been created, but it is reasonable to assume that the boy had spaces between his incisors which were taken up by a shift of the A| across the midline.

Fibrous epulides are most commonly found in patients in their third and fourth decade (Cooke, 1952) and they are generally thought to form in response to some local irritation. Epulides occurring in the younger age groups are more commonly of the giant-celled variety and are frequently associated with resorption of the teeth. In this case, although resorption of the B| and A| had already commenced by the time the tumour was removed, no giant cells were found on histological examination of the specimen. There was no apparent source of local gingival irritation that might have been responsible for the hyperplasia. There was no history of trauma, though this would seem to be the only possible cause for the lesion.

Acknowledgements.—I wish to thank Professor A. E. W. Miles and Mr. A. M. Horsnell for permission to publish this case; Mr. P. Broadbery and Mr. R. Gallup, of the London Hospital Photographic Departments, for the clinical photographs and photomicrograph, respectively.

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TEMPORARY RESTORATIONS AND DRESSINGS

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THE purpose of this paper is to present to the general practitioner some temporary restorations and dressings which have been found useful. They are used for the following reasons:—

1. To protect the dentine and pulp.
2. To avoid fracture of enamel margins or weakened cusps.
3. To prevent encroachment of the gingiva and sometimes to push the gingiva away.
4. To maintain the proximal relationships.
5. For æsthetic reasons.

Of these the protection of dentine and pulp is most important and needs further mention. Preparing a cavity involves cutting thousands, perhaps millions, of dentinal tubules. These contain dentinal fibrils which are prolongations of pulp-cells, the odontoblasts. To that extent the pulp is wounded at each operation. The cavity should therefore be dressed and the best dressing is probably zinc oxide-eugenol. However, caries might have led to calcification in the dentinal tubules (translucent zone) or to death of the dentinal fibrils (dead tract) and formation of secondary dentine. In such cases it is considered reasonable to apply dressings, such as zinc phosphate cement, which would otherwise be too irritant. However, it is acknowledged that it is not known clinically whether or not these changes have occurred. For this reason some operators might prefer to apply zinc oxide-eugenol before placing the zinc phosphate.

Most of what follows is well known, but it is hoped that the reader will find some ideas and techniques which are new to him.

For Cavities.—*Gutta Percha* is mainly used as a temporary restoration during inlay construction, its advantage for this purpose being that it is easily removed. Unfortunately it does not effect a complete seal and, perhaps as a result of this, the dentine becomes sensitive. However, this can be partly overcome by first applying a solvent, e.g., oil of cajuput or oil of eucalyptus, to the cavity to improve adaptation. These oils are also used to smooth the surface of the gutta percha when in place. Other solvents, e.g., chloroform, may be used instead, but this might cause mucosal damage or pain due to rapid cooling. The taste and odour might also be objectionable to some patients.

Generally, the gutta percha is applied after the cavity has been lined. Otherwise it is desirable first to apply a layer of zinc oxide-eugenol.

It is considered that there is a real risk that gutta percha may be applied at too high a temperature. This may not be noticed because of local anæsthesia, but damage may still be produced. It is suggested that a stick of gutta percha should be heated above the flame; not in it. The surface should remain smooth or become only slightly rough. If it becomes very rough or catches fire it should be discarded.

Zinc Oxide-Eugenol is widely used, largely because of its sedative value. It may be freshly mixed for each case or purchased ready for use in soft metal tubes, jars, or cellophane rolls. These save time and avoid wastage, but in some cases, e.g., temporary crowns, it is desirable to have a thinner mix.

One may incorporate a wisp of cotton-wool into the paste, but this is not recommended except in special cases (*see later*) because at the next visit it is difficult to excavate the outer portion of the dressing to leave the inner part as a lining.

A disadvantage of zinc oxide-eugenol is its slow setting, but this may be overcome by addition of accelerators such as zinc acetate. Addition of polystyrene has also been recommended and is said to give improved properties.

Application of the mix is facilitated by using a damp pledget of cotton-wool in college tweezers. For those who prefer to put it into place with a finger, a damp napkin should first be wrapped around the finger to avoid

the mix sticking and soiling the hand. The patient's lips should also be avoided, because the eugenol produces an unpleasant burning sensation.

Zinc Phosphate cement is better than zinc oxide-eugenol when the temporary restoration must last longer or when it must stand up to greater crushing forces. Examples are in filling a Class III cavity when endodontic treatment is to be carried out via the lingual fossa, or to fill the box portion of a Class II cavity, leaving access through the occlusal surface.

Because of its acidity, the application of zinc phosphate cement directly to normal dentine in deep cavities should be avoided. In such cases zinc oxide-eugenol should first be applied.

For Fractures of Posterior Teeth.—

1. *As a Result of Caries.*—In these cases it is assumed that there has been a defence reaction in the dentine and pulp so that the use of an acid cement is permissible. Gross caries is removed. As much unsupported enamel as possible is kept, and retention pits are cut in several places with a small round bur. The tooth is dried and a thin mix of zinc phosphate is applied, first to the retention areas and then as a larger portion. The cement should have been mixed slowly (in about 90 seconds) to give adequate working time. The patient's head should be so positioned that the zinc phosphate can be readily applied. The exact amount of cement should be used because trimming tends to dislodge it. The tooth contour is not restored so as to avoid breakdown during mastication (*Fig.* 1). If a buccal cusp has been left, the result is reasonably æsthetic as well as comfortable. If a buccal cusp has been lost it might be better to use self-curing acrylic instead.

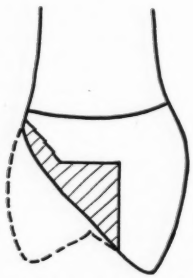


Fig. 1.—Upper premolar showing original outline (interrupted), fracture line (zig-zag), and the temporary restoration (shaded).

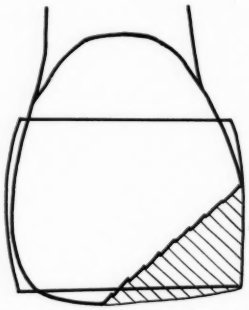


Fig. 2.—Upper central incisor showing band and zinc oxide-eugenol (shaded).

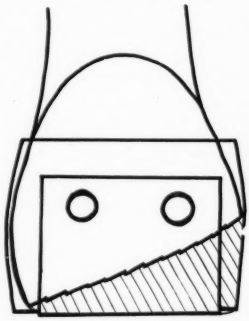


Fig. 3.—Upper central incisor showing band with incisal loop which has been welded to it at 0–0. The zinc oxide-eugenol is shaded.

2. *As a Result of Trauma.*—For teeth in which there is a large area of dentine freshly exposed by trauma, e.g., the whole facial cusp, it is desirable to use a zinc oxide-eugenol dressing and this can only be successfully retained by using a metal band. This may be an orthodontic band, copper ring, or aluminium shell crown. It is essential to check the occlusion.

If there is an associated fracture of the jaw the maxillo-facial surgeon will be able to cover the fractured tooth with a cap splint. The part of the cap splint covering the fractured tooth may be lined with zinc oxide-eugenol.

For Fractures of Anterior Teeth.—When dentine is involved without exposing the pulp it can sometimes be left in older people, but in younger people it is usually best covered with zinc oxide-eugenol. This may be kept in place by means of an orthodontic band as in *Fig.* 2, but if more of the incisal edge is lost an incisal loop of band material is added to give greater retention of the zinc oxide-eugenol as in *Fig.* 3. This may also be used following a

pulpotomy. In each case, care should be taken to avoid damage to the soft tissues by the edge of the band.

The method described above is æsthetically poor, so the use of a celluloid-type crown form may be preferable. A suitable one is trimmed to size, filled with zinc oxide-eugenol, and placed over the crown. If two small holes are first placed through the incisal edge of the crown form excess zinc oxide-eugenol can more readily escape. As mentioned earlier in this paper, it is essential that the mix should not be too thick. The zinc oxide-eugenol gives a white-looking crown which tends to come off, so it is considered preferable to apply a small quantity of zinc oxide-eugenol directly to the exposed dentine and to cement the crown form on with zinc phosphate or silicate. The crown looks better and is better retained.

For Jacket-crown Preparations. — *Gutta Percha* may be used. This protects the prepared tooth from heat and cold, but tends to come off, looks poor, leaks, and leaves the dentine sensitive. It is not recommended.

Temporary Jacket-crown using Silicate Cement.—A jacket-crown preparation has a large area of exposed dentine which must be protected. A suitable celluloid crown form is trimmed and fitted. It is then removed. A mix of zinc oxide-eugenol is made and some fibres of cotton-wool are incorporated. This is applied to the preparation as a protective layer in such a way that the fibres slightly overlap the gingival margin. The prepared crown form is partly filled with a suitable shade of silicate cement and placed over the preparation. By guiding it up the lingual surface of the tooth more silicate stays facially and a good æsthetic result is achieved.

The overlapping fibres of cotton-wool are turned back over the gingival part of the crown as shown in *Fig.* 4. At the next visit this temporary crown should be preserved so that it can be re-applied if necessary.

Temporary Jacket Crown using Acrylic Resin.—Instead of silicate cement cold curing acrylic resin may be used as above, except that the crown form should be made of cellulose acetate. The latter is later stripped off.

An acrylic crown form may also be used. This is colourless, is filled with an appropriate shade of cold curing acrylic, and applied to the preparation. The crown form becomes attached to the acrylic inside it. It is important to remember that the pulp may be damaged both by the free monomer and by heat from the exothermic reaction, so a protective layer of zinc oxide-eugenol should first be applied to the preparation. To guard against the eugenol plasticizing the acrylic some operators prefer to coat the preparation with petroleum jelly or cavity varnish.

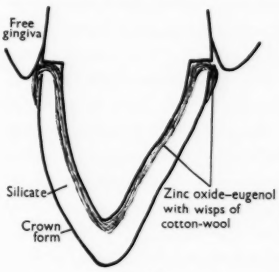


Fig. 4.

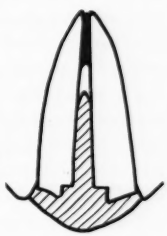


Fig. 5.

Fig. 4.—Temporary crown showing the zinc oxide-eugenol with wisps of cotton-wool included lying immediately over the preparation.

Fig. 5.—Gutta percha (shaded) in an upper central incisor which has been prepared for a post crown. The undisturbed apical portion of root filling is shown in solid black.

A heat-cured acrylic jacket crown may also be fitted, pending the construction of a porcelain jacket crown, or a ready-made acrylic crown may be used.

For Post-crown Preparations.—*Gutta percha* may be used to cover a post-crown preparation. A stick of gutta percha is warmed and drawn out to a shape like a gutta percha point, so that it will be retained in the root canal. Oil of cajuput or eucalyptus is applied to the preparation. The gutta percha is applied warm, and moulded to cover the root surface and so keeps the gingiva in its normal position. The gutta percha is left flush with the gingival margin and smoothed with a suitable solvent (*Fig.* 5). This is adequate for a day or two; otherwise a temporary crown is indicated.

Temporary Post-crown.—A suitable acrylic crown form is trimmed to fit the preparation. This is better done with a stone than with scissors, as the latter cause the acrylic crown form to splinter. A piece of wire is fitted to the canal and its outer end is bent to give retention. The correct shade of cold curing acrylic is mixed, and used firstly to cement the wire, and secondly to fill the crown form which is then applied over the wire. When the acrylic has polymerized, the crown is adjusted for articulation.

For Pinledge Preparations and Three-quarter Crowns.—Zinc oxide-eugenol with cotton-wool fibres incorporated is applied to the cut surfaces and retention is improved by a silk ligature tied around the neck of the tooth.

When pinholes are present it is better to use the following method. Short lengths of nylon fishing line of the appropriate diameter are placed in each pinhole, their outer ends having first been flattened by squeezing in a pair of warmed pliers. This aids retention. Cold curing acrylic is then applied to the preparation to form a thin layer which is retained by the nylon pins. If much dentine is exposed it may be covered with a thin layer of petroleum jelly or cavity varnish before applying the acrylic.

For Veneer Crowns.—A suitable size of seamless aluminium shell is correctly contoured to the gingival margin and adjusted to the occlusion. It is partly filled with zinc oxide-eugenol and firmly seated in position. It is very soft and moulds to the occlusion. When removed at the next visit it is retained and may be reapplied.

Temporary Bridge.—This is desirable for æsthetics and also to maintain the interproximal relationships whilst the permanent bridge is being made.

An impression in rubber base material is taken prior to the preparation of the abutment teeth, which are then prepared in the usual manner. A channel is cut in the rubber joining the impressions of the abutment teeth. Self-curing acrylic resin is then flowed into the channel and into the impressions of the abutment teeth, and the whole repositioned on the prepared teeth which have been coated with a layer of petroleum jelly and left until the resin has polymerized. The impression is then removed from the mouth, and the rough acrylic bridge so formed is separated and trimmed to give a temporary bridge which is then replaced in position using zinc oxide-eugenol.

Effect of Silicate Cement and Amalgam on the Gingivæ

Following the report on the effect of acrylic resins on the gingivæ (Waerhaug and Zander, (1957) *J. Amer. dent. Assoc.*, **54,** 760) a comparison is made between the effects of acrylic resins and those of silicates and amalgams.

Twenty cavities were prepared in the gingival third of teeth in monkeys: 8 were filled with amalgam, 8 with silicate and 4 with acrylic, and 4 unfilled teeth were used as controls. Half the fillings were highly polished. After three months the teeth and adjacent gingivæ were removed for histological examination. Clinically the restorations were assessed as "good" to "excellent". Histologically both silicate and amalgam showed similar reactions of a severe inflammatory nature. The adjacent epithelium was very thin and strands of epithelial cells extended deep into the areas of cellular infiltration. Many leucocytes and lymphocytes were present in the epithelium and these cells had also migrated through the epithelium and were in contact with the filling. A common finding was a crevice between silicate and cavity, which was filled with a plaque-like material and round cells. The reaction was stated to be similar to that evoked by calculus.

No differences were detected in response to the polished and the unpolished fillings. It was difficult to decide if silicate, amalgam, or acrylic produced any differences in degree of inflammation, though it was thought that acrylic gave the least response.—ZANDER, H. A. (1957), *J. Amer. dent. Ass.*, **55,** 11.

PREVENTION OR CURE*

By **HAMISH THOMSON**, L.D.S., R.F.P.S. Glasg., H.D.D., R.C.S. Edin., D.D.S. (N.U.)

THERE are many possibilities for subject matter in a presidential address, especially when it is known that whatever is said will be received with the respect due to the dignity of office, and without criticism, at least in public. There are temptations to grind a favourite axe, to relate successes with the help of Kodachrome, or simply to spin a yarn. On the other hand there are opportunities to launch this Society on its tenth year with an exhortation and a challenge: to urge it on its way, to examine its beliefs, and to be an example to the profession. No other society has such an opportunity to produce health in the mouths of the community; and healthy mouths produce well-being. This Society then has the bit between its teeth. As your President for the tenth session I shall do my best to follow in the footsteps of nine illustrious predecessors and give a lead with one objective chiefly in mind: prevention.

It is as a practitioner that I am going to address you now, and with only ten years in practice, at that. Those ten years began, however, under the guidance of one of our past Presidents, whose example in the handling and treatment of periodontal disease has been one of the dominating influences in my professional life. His contributions to and his concern for this Society need no statement, and without his influence it is doubtful if dental health education would have progressed so far in the world to-day. I refer, of course, to Mr. Leatherman, and any address by me to this Society would be without root cause without a tribute to him.

It is with all humility that I pay a second tribute to Sir Wilfred Fish. His teachings and writings on periodontal disease had a formative effect on my interest in saving people's teeth. His brilliantly clear writing simplified the study of this disease for every dentist. This Society has good reason to be proud of its first President.

One final tribute I must pay. It is to one of our newest members and to my oldest counsellor and friend. I refer now to my father, whose real ability, enthusiasm, and capacity for work in the practice of dentistry have always been my chief example.

My address has a title which is intended to be a challenge, and I hope to present it to you in a manner which will be at the same time intelligible and provocative.

Whether it is intended to prevent or to cure periodontal disease, some statement on the pathogenesis of the condition must be given in order to provide a premise for my argument. I intend to exclude the more specific diseases of the gingiva and oral mucosa and confine the discussion to the periodontal tissues. The present state of my knowledge, on which I base treatment, is that the majority of periodontal disturbances begin as a breach in the epithelium lining the gingival sulcus.

There is an inflammatory response under this ulceration and if the ulcer is allowed to persist toxins penetrate into the sub-epithelial tissues. Destruction of the periodontal fibres under the gingival crest follows. Then comes resorption of bone by osteoclasts in response to further intoxication, and disease of the periodontium is under way. The pathological effects of this initial lesion include a loss of attachment of the oblique periodontal fibres, and a growth downward of the epithelium to cover this loss. Pocket formation follows progressive loss of interdental bone. Ulceration extends as debris collects in the pocket, and this results in a more extensive intoxication with subsequent deterioration of the condition. All this can happen, provided there is no attempt to remove the cause of ulceration of the epithelium in the gingival sulcus. There is no convincing evidence that periodontal disease begins in any tissue other than epithelium.

* Presidential Address delivered to the British Society of Periodontology, Oct. 13, 1958.

To the best of my knowledge this ulcer is caused by an irritant which lodges in the interdental space. Thus any factor in the mouth which permits stagnation between the teeth can cause this ulceration. It is well known that there are conditions in the system which permit ulceration to take place more easily in some mouths than in others. Pregnancy is an example: diabetes is another. There would also seem to be conditions which permit early development of periodontal disease, and the rapid loss of bone which follows results in a condition which is sometimes given the name periodontosis, for want of a better word and for want of more knowledge. On the other hand there would seem to be conditions which inhibit the onset of periodontal disease in spite of local causes being present. These two extremes, however, occupy a small percentage of the cases we see in practice, and our concern is with the much more common, often less easily recognized, manifestation of periodontal disease.

The early sign of incipient periodontal disease is bleeding gums, and this should be as important a sign of potential tooth loss as a carious cavity. At this stage periodontal disease can be prevented. We have therefore before us a choice. A choice between prevention and cure: between prevention at the stage of the initial lesion, or before, and cure once the disease has been established.

Cure is often attempted when deep pockets are present, when toxins are being spread and abscesses forming. To be effective, cure has often to depend on the most highly skilled specialist. Apart from the skill necessary, a consideration of the principles, methods, and devices used in the treatment of periodontal disease leaves one in no doubt that the therapy is time-consuming and costly: and not always successful. Consider then: deep scaling and curettage: pressure packing: gingivectomy in all its forms, and gingivoplasty: bone grafting: splinting, both removable and fixed: and not least or last, home care involving the unceasing co-operation of the patient. A vigil without relief.

There are some patients who will accept this treatment and can sustain the post-operative vigil, and there are some patients or authorities who can pay for it. There are some dentists who have the necessary training and skill to provide this service, and with success. There will always be a need and a demand for this superior service. Therapeutic skill should never be underestimated. But for the average patient attending the average dentist this service cannot be provided. And the average patient—average dentist combination occupies the large majority of dentistry being enacted in this country to-day.

There are few more discouraging set-backs for the average patient than to be told that he needs another gingivectomy, or that the tooth under his splint has decayed and will have to be extracted after all. It is not good for the patient: it is not good for the dentist: it is not good for dentistry. How much work has each one of us done that has had to be undone, or has resulted in the need for more work? How much optimism has been unjustified? Periodontal disease is the chief cause of lost teeth, and one has to stop sometimes and ask: Would it not be better to anticipate the end at an early stage and take the more practical expedient of full dentures, rather than spend time and money prolonging the eventual agony for only a few years? This is undoubtedly one alternative to the difficulties and problems of treating well-established periodontal disease, though one hesitates to advise it, in view of the quite unworthy state of full denture practice to-day.

So much for the cure side of the picture: it is a depressing picture. Let us now consider prevention. Prevention of disease presents the biggest challenge in any study of disease, and periodontal disease is no exception. Progress in the study of periodontal disease must be concerned basically with prevention. Writing on this subject of progress, Arnold Toynbee said in a recent article that "progress involves conflicts, changes of mind and, above all, choices. And a choice involves a price. We do not have to choose between things we want and things we do not want. Choices are forced on us when we want two or more things that are mutually exclusive, or at least not completely reconcilable with each other".

Progress in the prevention of periodontal disease must begin with a choice between having our teeth and neglecting them. Both desirable, but mutually exclusive. And so we come to the major question that every dentist and every patient has to answer. How important are my teeth to me, and how important are they to my health? Is oral health really necessary? I believe that the comfort, the well-being, and the efficiency of a healthy mouth contribute greatly to the physical and mental health of the individual. And conversely, I believe that many a physical and mental breakdown can be attributed to a breakdown in the health of the mouth. This conviction must be held by the dentist, and be manifest by a healthy mouth in the dentist himself. How can he preach hygiene and function to patients if his own mouth presents a picture of ulceration and pockets, stagnation, and old, dead blood?

If the dentist is convinced, the patient can be convinced, but not unless. There will always be those who do not care about oral health, and if the demand by those who do care about oral health is great enough, then those who do not care should receive the most summary treatment. It is not enough to cure sometimes, to relieve often, and to comfort always, nice and soothing as this dictum is to us professional men. It is enough only to begin at the source of the disease and, if necessary, leave the estuary of neglect to run into the sea.

If the assumption of oral health is accepted, the prevention of periodontal disease can be considered. This can be achieved by the adoption of the three following conditions: (1) An up-to-date knowledge of the histological features of and the pathological processes occurring in the periodontal tissues. (2) The institution and maintenance of good hygiene in the mouth. (3) The institution and maintenance of good function in the mouth.

With regard to knowledge, it is sometimes embarrassing when a colleague or a patient asks us what we know about this disease. It is often difficult to find what the up-to-date state of knowledge of the tissues and of this disease is. Most text-books are so padded with non-essentials that it is difficult to find the essence in so much substance. However, we must know what goes on, and if we are not sure we must ask. By no coincidence the title of the paper at our first ordinary meeting next month is "Pathological Changes in the Interdental Tissues". No member of this Society has any right to stay away.

With regard to hygiene, I would suggest no one who has insisted successfully on interdental hygiene in his practice is unaware of its success as a treatment measure in incipient periodontal disease. Removal of irritants from these spaces removes the cause of ulceration. The continued use of some form of interdental hygiene, such as by soft wood sticks, not only prevents the further lodgement of irritants, but stimulates keratinization of the epithelium to take place. Further ulceration can therefore be prevented.

With regard to function, I would suggest that no dentist can be unaware of the good effects of a complete dentition in good function. As a preventive measure against stagnation it is without equal, and no emphasis can be too strong of the need for the development of a well-conserved and, where necessary, an orthodontically corrected dentition in our teen-age patients. It is equally no coincidence that the title of the paper at our second meeting is "Orthodontic Treatment and the Periodontal Tissues".

As a treatment measure, the restoration of function to a broken-down dentition sometimes provides the cure for incipient and advanced periodontal disease. However, the workmanship necessary for such restorative treatment requires the highest degree of skill, both in the surgery and the technician's laboratory. And, here again, the work is time consuming and expensive. It is successful only if the operator and the patient are dedicated to the job in hand. Expertly done, it can succeed. How much better and easier would it be to prevent such a breakdown. The loss of one tooth, or the excess of one tooth, in a young patient's mouth can lead to a functional disorder which permits stagnation to take place, and the conditions are ready for periodontal disease.

My plea, therefore, is that the highest priority be given to the production of complete dentitions, in good alinement, in our young patients. It follows that there is the greatest need for painstaking children's dentistry and well-planned orthodontia. Coincident with this must come the education of these young people in the value, and the methods, of hygiene in order to maintain these dentitions in their supporting structures. This Society must, therefore, extend its influence to those concerned with the conservation and correction of children's teeth. We must extend our influence to them because we need their help.

This objective poses some seemingly insoluble problems. How can some ten thousand dentists produce several million young adults with healthy and complete dentitions, even on a fifteen- or twenty-year plan? First, there are not the pairs of hands to do it. Secondly, the younger generation is being allowed to destroy its dentitions by the diet chosen for it, and by the still low priority given to care of the teeth. Thirdly, there are still the widespread millions of adults who need attention.

I have no solution to offer. A few suggestions are, however, made.

The profession needs help from ancillaries. Any dentist who puts professional pride or prejudice before the help that hygienists can provide is unconcerned with the health of the community. But we need help in filling young teeth as well as in keeping them clean, and ancillaries must be provided for this purpose if the objective is to be attained.

The profession needs help from every agency known to be effective in protecting young teeth. Fluorine in the water-supply is known to be helpful in this respect. But in order to have this help we have to combat the reactionary elements in the community who, for unscientific reasons, are opposed to it. We have also to combat the shrugging acceptance of this situation by members of our own profession. We must do combat with these elements.

The profession needs to develop an all-out attack on the first signs of gingival disturbances: an attack directed at clearing away the cause of bleeding gums, and preventing recurrence. It is not wholly the dentist's fault that the first thing, and often the only thing, he looks for in a mouth is the number of fillings to be done. It is largely the fault of his education and of the system in which he now practises. Members of this Society have an obligation to examine the gingival and periodontal tissues of a new patient, and particularly of young new patients. All that is needed is a small blunt instrument, and a pair of eyes. Let us pick up the small blunt instrument with the same sense of purpose that we pick up the sharp probe.

The profession needs more evidence to convince more dentists that hygiene can be a cure for, and a prevention against, incipient periodontal disease. And if this seems to be putting the cart before the horse, I can only say that there are some of us in this Society who are convinced about the success of this measure, but undocumented clinical conviction is not a strong enough horse to pull the cart of the profession at large. We must have a stronger horse.

The profession needs more evidence from our scientists of the sort of mouth in which periodontal disease begins. And it needs the histopathological evidence, from the microscope, to tell us more about the type of tissue we are dealing with, and how it responds to irritation and disease.

All this we do need. And if all this seems too much I think we need one thing more. And this is a Ministry of Health, instead of a Ministry of Disease which we now have: perhaps this might be called the Ministry of Diet and Hygiene. Run by a benevolent dictator, it would somehow remove the refinement from our food which permits stagnation, and allow us to eat only that which was known to be health-preserving and detergent: and it would provide a benevolent big brother for every home, and he would ensure that every interdental space was clean before its owner went to bed. It saddens me that this can only be a Utopian dream.

In all seriousness, we need a change in attitude towards health and disease. We have come a good way along the road of discovery of the cause of disease. And this road should

be leading to prevention of disease. And it is a road which should be travelled by every member of this Society.

I am not sad, therefore, when I realize that I have a year at the head of this Society, which has such an opportunity to promote and advance the study of Periodontology, and by so doing we may develop, in the community at large, a healthy mouth in a healthy body.

BOOK REVIEWS

ORAL ROENTGENOGRAPHIC DIAGNOSIS. By EDWARD C. STAFNE, D.D.S., F.A.C.D., Senior Consultant, Section of Dentistry and Oral Surgery, Mayo Clinic, and Professor of Dentistry and Oral Surgery, Mayo Foundation, Graduate School, University of Minnesota, Rochester, Minnesota. 10 × 7 in. Pp. 303 + viii, with 1338 illustrations on 423 figures. 1958. Philadelphia and London: W. B. Saunders Co. £5 1s. 6d.

THIS is a first-class book. As one reads from the opening chapter with its accurate description of normal anatomy onwards, one realizes that for the most part the author's opinions are supported by personal observation. On the few occasions where even his large experience does not enable him to speak with this assurance he makes this plain to the reader.

The sections on each subject are brief and the illustrations to the point. The quality of reproduction of the radiographs is high so that the points they are intended to illustrate are easily seen.

For those who are interested in oral manifestations of systemic disease this book will be of special value. Only the equation of diabetes mellitus with hypo-insulinism jars the mind of the reader. The reviewer can wholeheartedly recommend this book. G. R. S.

SERIAL EXTRACTION AND MECHANICALLY GUIDED DEVELOPMENT. By JOHN HEATH (Sen.). Pp. 28. 1958. Melbourne: Verona Press.

THIS booklet represents a series of lectures delivered to the sixth Convention of the North Queensland Branch of the Australian Dental Association.

The author summarizes the indications and contra-indications for serial extractions and relates the problem to dental skeletal patterns. He emphasizes that serial extractions should be carefully planned and followed by appliance therapy. The appliance recommended is the X plate designed by the author. This enables either the incisor segment to be retracted or the posterior segment to be moved forward by means of two parallel running screws embedded in a plate divided coronally. The details of the appliance are given. Consideration is given to the problems of anchorage and overbite. J. S. R.

PERIODONTICS. A Concept—Theory and Practice. By BALINT ORBAN, M.D., D.D.S., Croyola University School of Dentistry, Chicago, Ill. Assisted by FRANK M. WENTZ, M.S., Ph.D., D.D.S., FRANK G. EVERETT, M.S., D.M.D., M.D., and DANIEL A. GRANT, D.D.S. 10×7 in. Pp. 537, with 439 illustrations. 1958. London: Henry Kimpton. 110s.

THERE are many text-books on periodontology, but none really suitable for the undergraduate student or the general practitioner. This new book was therefore read with a feeling of expectancy, in the hope that it might fill the gap. Orban has tried a new approach, his aim being to link the basic structural and pathological knowledge to the problems of periodontology as they are faced in everyday practice, and in this way to produce a text containing "all the background material for teaching the basic principles of periodontics". In this aim he has succeeded in so far as the book is refreshingly different, but he has failed partly due to not carrying his intentions to their logical conclusions. For instance, the book opens, as have many previous books on the subject, with chapters on the anatomy of the periodontium and physiology of the mouth, both of which could have been written from

the clinical rather than the factual angle. Then again it was not the author's intention to emphasize techniques, but these on occasions are belaboured and actually occupy a considerable portion of the book.

There are two serious drawbacks from the undergraduate teaching point of view: first the use of many new and undefined terms which are not in current use either in this country or in the United States, and secondly the use of the book as a platform for the argument and statement in unequivocal terms of the author's own views, no cognizance being taken of opinions held by some which may be diametrically opposed. This omission is not made good by an adequate list of references to all viewpoints. The author states that "most of the material was circulated to the panel of contributors for comments, criticisms and suggestions. These were evaluated and incorporated where applicable to the basic concepts". One wonders how many criticisms and suggestions were in fact incorporated.

As we have come to expect from past experience of the author's books, the illustrations are really excellent: clinical photographs, radiographs, and photomicrographs. Indeed, the book could well be bought for the value of the photographs themselves. Though the book cannot be recommended for the undergraduate, it should be part of the reading of the post-graduate student, and would be of value to the practitioner who already has some basic knowledge of the subject.

A TEXTBOOK OF ORAL PATHOLOGY. By WILLIAM G. SHAFER, B.S., D.D.S., M.S., Associate Professor of Oral Pathology, Indiana University School of Dentistry; MAYNARD K. HINE, D.D.S., M.S., Dean, and Professor of Periodontology, Indiana University School of Dentistry; and BARNET M. LEVY, A.B., D.D.S., M.S., Professor of Pathology, University of Texas Dental Branch. $10\frac{1}{4} \times 6\frac{3}{4}$ in. Pp. 714 + viii, with 416 illustrations. 1958. Philadelphia and London: W. B. Saunders Co. 105s.

IT is always an honour and a great responsibility to review the first edition of a new textbook, but great is the reward when one can praise without reservation the authors and publishers for producing a fine book. This is indeed such a book, well written, beautifully illustrated, and embodies accurate up-to-date knowledge on the clinical, radiological, histological, and treatment aspects of oral pathology.

The authors are already well known for their valuable original contributions to this subject, so that their approach is refreshingly a personal one.

The text is divided into five main sections, disturbances of development and growth, diseases of microbial origin, injuries and repair, disturbances of metabolism, and diseases of specific systems. References are given at the end of each chapter. This arrangement according to the main disorder of physiology is a great improvement on the all too common anatomical divisions such as chapters on lesions of the lips, tongue, etc.

New terms are not unnecessarily introduced, although para-oral is an unusual word. The authors condemn the use of the word epulis and say it should be discarded, but it is of interest to note that it is so ingrained in their vocabulary that it appears elsewhere in the text. The clinical pictures are excellent, but the photomicrographs would be improved if the blocks were larger.

The authors hope that this book will be useful to undergraduate and graduate students and practitioners of both dentistry and medicine. Impossible, and that underlies the only real criticism the reviewer has of this book. There is too much in this book for the already overburdened undergraduate student. The field of general pathology has been invaded too far with sections on rare oral lesions such as the neurilemmoma, while there is room for expansion on sections such as the one dealing with the radiographic diagnosis of the adamantinoma. Nevertheless, this is of small account, and does not in any way detract from the overall value of this magnificent book.

The book is beautifully produced, with clear print on good paper, excellently illustrated, and is handsomely bound.

For selected reading this book will be useful to the undergraduate student of this country,

while for the postgraduate it will be of inestimable value. To all those who wish to regard themselves as authorities on lesions of the mouth, this book will repay very careful reading. Few things can do more to reflect the standard of dentistry to-day than a text-book written and produced to such high standards as this one. B. E. D. C.

ABSTRACTS FROM OTHER JOURNALS

The Application of the Ultrasonic Dental Unit to Scaling Procedures

The purpose of the study reported here was to demonstrate the effectiveness of ultrasonic energy when applied to the removal of calculus and other deposits from the teeth. This demonstration included a comparison of the ultrasonic method to routine hand scaling methods.

The comparison of the ultrasonic to hand scaling showed that neither method was superior in the quality of the scaling since both instruments demonstrated good results subgingivally. Since more deposits were removed in the allotted time with ultrasonic scaling than with conventional scaling, the ultrasonic scaling method was judged superior. This, coupled with the removal of stain, weighed heavily in favour of the ultrasonic method. Some time was lost in the hand scaling procedures because the patient was permitted repeated rinsings.

The experiment demonstrated the fact that the cementum and even dentine of the root can be injured with the ultrasonic technique.

Seven ultrasonic scaling tips were designed and a discussion of their application to scaling procedures was presented. The procedures were illustrated with photographs showing the relative position of the instruments to a typodont.

The conclusions reached from the experimentation are as follows:—

1. The ultrasonic scaling technique will remove calculus.

2. Only light pressure is necessary to scale with the ultrasonic technique.

3. Cementum under calculus is virtually unharmed after scaling if the working end of the instrument is flat instead of sharp and only light pressure used during scaling.

4. Stains are effectively removed with the ultrasonic scaling technique.

5. Comparatively little hæmorrhage is associated with the ultrasonic scaling procedure.

6. The adequate removal of calculus is accomplished more rapidly with the ultrasonic scaling method than with conventional scaling methods.

7. Calculus removal is possible using the ultrasonic method without water but is impractical owing to heat generated from friction.

8. When water hits the vibrating scaling tip a mist is generated which makes vision difficult.

9. A preference was registered by patients for ultrasonic scaling when compared with hand scaling.—JOHNSON, W. N., and WILSON, J. R. (1957), *J. Periodont.*, **28**, 264.

Effect on Gingiva and Occurrence of Pigmentation on Teeth following the Topical Application of Stannous Fluoride or Stannous Chlorofluoride

It has been reported that a solution of stannous fluoride at a concentration of 1000 μg. fluoride per ml. will stain the teeth and gingiva if they are subsequently treated with a solution of hydrogen sulphide. As a result of such *in vitro* studies, some clinicians have questioned the use of stannous fluoride as an anticariogenic agent since its use may result in detrimental æsthetic effects.

This study was conducted by applying highly concentrated solutions of stannous chlorofluoride topically to the teeth of either children or adults, and compared with similar groups receiving topically applied distilled water, in order to study the effect of the fluoride treatment on the pigmentation of the teeth and its effect on the oral mucous membrane. The results of these studies suggest that pigmentation of the carious areas in a tooth is a normally occurring phenomenon.

Following the topical application of highly concentrated stannous fluoride solutions, there is a tendency for more pigmentation to be found in the occlusal and buccal surfaces of the molars, the occlusal surface of the bicuspid, and the labial surface of the anteriors. The non-carious tooth surface is not affected by the fluoride application to any greater degree than results following the topical application of distilled water. The peripheral portion of the interdental papilla is blanched in about 5 per cent of the cases treated with stannous fluoride if a gingivitis is present at the time of the topical application.—MUHLER, J. C. (1957), *J. Periodont.*, **28,** 281

Cartilage Grafts in Human Periodontal Pockets

Seventy homogenous grafts of cartilage were made into pockets in 26 patients aged between 18 and 56 years. The cartilage had been obtained from the noses of other patients and had been preserved in 70 per cent ethyl alcohol and stored in a refrigerator for periods varying between 7 and 90 days. Before implantation the cartilage was removed from the alcohol and placed in saline for one hour. Forty-one of the pockets were supracrestal and 29 subcrestal. Thirteen pockets were treated at the flap operation and the remainder simply by implantation at blind curettage.

Post-operative assessment by radiographs showed a new cortical crest in 7 and new bone coronal to the old in 21; a further 22 pockets showed no radiographic changes. In clinical measurements re-attachment varied between 0·5 mm. and 6 mm. in 60 of the 70 grafts, the initial pocket depths varying between 3 and 12 mm. Gingival recession occurred in 55 cases, with a variation of between 0·5 mm. and 4 mm., though it should be noted that in all cases a partial gingivectomy was performed before the curettage and grafting. Final pocket depths varied between 1 and 7 mm., and in 15 the final depth was 4 mm. or more. Root planing was performed in all cases.—SCHAFFER, E. M. (1958), *J. Periodont.*, **29,** 176.

LETTER TO THE EDITOR

December 23, 1958

Dear Sir,

We were most interested to read the paper by G. L. Slack and R. H. Birch, published in the November 1958 issue of the DENTAL PRACTITIONER. However, in the treatment of replanted teeth they do not mention the need for routine reference to a physician for prophylaxis against tetanus.

As one of their cases reports that a tooth was replanted after being knocked out on a roadway, where the risk of tetanus contamination is considerable, we feel obliged to point out what might be a serious or even fatal omission.

In a paper published in the *British Dental Journal*, September 18, 1951, advocating an almost identical method of splinting (but using X-ray lead foil instead of milk-bottle caps) we stressed the importance of prophylactic anti-tetanic serum.

It would be disastrous if the patient developed tetanus as the result of tooth replantation.

Yours faithfully,

C. COOKE,
T. C. ROWBOTHAM

Turner Dental School,
Bridgeford Street,
Manchester, 15.

CENTENARY CELEBRATIONS OF THE GRANTING OF THE ROYAL CHARTER BY MEANS OF WHICH THE LICENCE IN DENTAL SURGERY WAS INSTITUTED

THE following provisional programme has been arranged in connexion with the Centenary Celebrations:—

Wednesday, July 22, 1959:—
Evening: Reception for Fellows and Licentiates in Dental Surgery.

Thursday, July 23, 1959:—
Morning: Opening of Historical Exhibition.
Scientific Demonstrations.
Afternoon: Menzies Campbell Lecture by Professor Robert Bradlaw, *C.B.E.*, F.R.C.S., F.D.S. R.C.S.
Scientific Demonstrations.
Evening: Centenary Festival Dinner.

Friday, July 24, 1959:
Morning: Annual General Meeting and presentation of Addresses.
Afternoon: Scientific Symposium on "Treatment of the Cleft Palate".
Evening: Reception by the University of London.

All the events will be held at the Royal College of Surgeons of England, with the exception of the Reception kindly given by the University of London which will be at the Senate House.

The Historical Exhibition will be on view throughout the programme.

DETERMINATION OF THE ANGLE OF ROTATION OF THE UPPER FIRST PERMANENT MOLAR TO THE MEDIAN RAPHE OF THE PALATE IN DIFFERENT TYPES OF MALOCCLUSION

By **SHELDON FRIEL**, F.D.S. R.C.S.
Professor of Orthodontics, University of Dublin

IT HAS been my experience that a large number of children of between 8 and 9 years of age retain the occlusion which would have been correct at 3 years of age. No forward positioning of the lower deciduous arch in relation to the upper arch has taken place. In the majority of these cases the upper arch has not widened sufficiently to release the lock of the deciduous canines and molars so that the lower arch can move forward; in addition, the upper first permanent molars are rotated mediolingually. These cases can be corrected very easily at the period of the mixed dentition by expansion of the upper arch and rotation of the first permanent molars, the lower arch usually moving into good occlusion of its own accord. Unless the upper and lower first permanent molars lock in their correct anatomical occlusion there will be more probability of a relapse after treatment.

Table I.—ROTATION OF UPPER FIRST MOLARS IN RELATION TO MEDIAN RAPHE OF PALATE

	Normal Cases		Post-normal Cases		Extraction Cases	
	Right	Left	Right	Left	Right	Left
Number	34	34	30	30	30	30
Mean in degrees	59·78	56·71	52·12	51·30	45·55	47·03
Standard deviation	5·32	6·44	6·01	7·21	8·31	9·91
Error of standard deviation	0·91	1·10	1·10	1·32	1·52	1·81

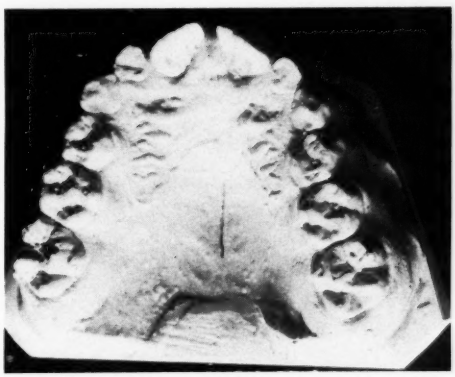


Fig. 1.—Showing marking of palatal raphe.

Table II.—COMPARISON OF SIDES

Significance of Difference between the Means of Normal Right Side and Normal Left Side

Actual difference: right 59·78°—left 56·71° = 3·07°.
Standard deviation 2·15.
The difference is significant.

Significance of Difference between the Means of Right Side Normals and Right Side Post-normals

Actual difference: normals 59·78°—post-normals 52·12° = 7·66°.
Standard deviation 5·43.
The difference is significant.

Significance of Difference between Means of Left Side Normals and Left Side Post-normals

Actual difference: normals 56·71°—post-normals 51·30° = 5·41°
Standard deviation 5·43.
The difference is significant.

Table III.—COMPARISON OF SIDES

Significance of Difference of Means Post-normals and Extraction Cases

Post-normal Cases Right and Left Sides together

Mean 51·71°.
Standard deviation 0·86.

Extraction Cases Right and Left Sides together

Mean 46·29°.
Standard deviation 1·18.

Given at the Jubilee Meeting held on May 10, 1958.

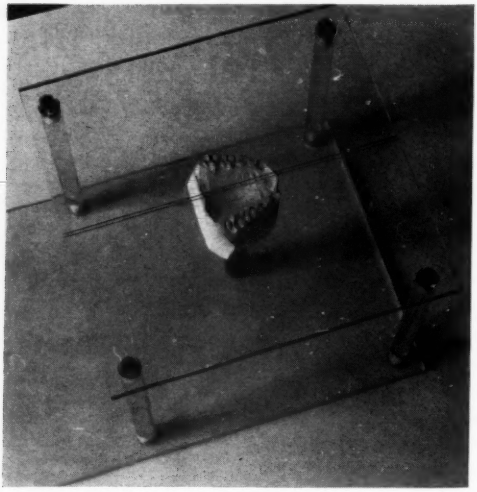


Fig. 2.—The apparatus.

A rotated upper first permanent molar can be observed with experience, but observation alone will not determine the degree of the rotation.

of the mediobuccal and mediolingual cusps and the median raphe. The raphe is marked far back where the vault of the palate is nearly flat (*Fig.* 1). It seems to me that this posterior end of the raphe was less likely to be influenced by environment than the anterior.

The apparatus to measure the angle of a line joining the two cusp points with the raphe consists of a sheet of perspex $\frac{1}{4}$ in. thick. A line is drawn anteroposteriorly on both sides of the sheet, each exactly opposite the other (*Fig.* 2). The sheet is supported on four pillars—the model is placed underneath the sheet and held in contact with it by a spring-loaded pointer. The model is now adjusted (*Fig.* 3) so that the three lines appear as one line. A tightly stretched fine wire is placed on top of the perspex sheet and in line with the points of the marked cusps. A protractor gives the angle of rotation.

The investigation consisted of 34 cases of normal occlusion in the premolar–molar area. These cases were mainly first year medical students. The second group consisted of 30 cases of post-normal occlusion with

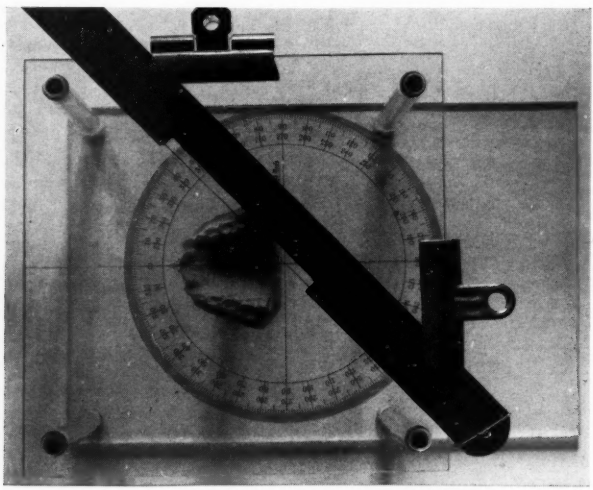


Fig. 3.—Method of measurement.

In order to discover the degree of rotation in different types of malocclusion, I have used the angle formed by a line joining the points

labioclination of upper incisors and the third group of 30 cases where the upper second deciduous molar had been prematurely extracted.

The results of this investigation showed that in the first group (the normals) the mean angle on the right side was 60° and on the left side 57°. In the second group (post-normals) the mean angle on the right side was 52° and on the left side 51°, and in the extraction group the right was 45° and the left 47°. These figures are given in round numbers.

It was interesting to note that there was a significant difference between the right and left sides in the normals and in the post-normal cases, the left molar being more rotated. There was a significant difference between normals and post-normals on both sides. The extraction cases were far more rotated. (*Tables I–III.*)

Acknowledgements.—I am indebted to Mr. Thornton of Trinity College for working out the statistics and to Dr. Dockrell for the photographs of the machine.

DISCUSSION

The Chairman thanked Professor Friel for his interesting paper. The point which seems to be of importance is whether the actual angle of the two buccal sides to the median line was being measured or whether it was the rotation of the molar beyond that line. If it was the first then in a converging arch the angle must be smaller than in a squarer arch.

Professor Friel replied that it was the rotation of the molar beyond the line of the arch.

The topic was then opened for general discussion.

Mr. E. K. Breakspear thanked Professor Friel for his paper and said that he was interested in the difference between the left and right sides. He was not quite clear as to which was the more affected; could Professor Friel clarify this point?

Mr. J. R. E. Mills asked Professor Friel if he could give any reason for the rotation of the upper molars. In normal occlusion the mesiolingual cusp of the upper first molar occluded in a deep fossa in the centre of the lower first molar. This forms a very constant relationship throughout all mammals and constitutes a strong mechanical lock. It seemed to Mr. Mills that when the upper molar tended to drift mesially, it was easier for the buccal cusps to do so than it was for the mesiolingual cusp. Consequently, the tooth tended to rotate.

He wondered if Professor Friel knew where the mesiolingual cusp occluded in cases of post-normal occlusion.

Mr. A. G. Taylor said that one point about the paper that was intriguing was that in the normals the right differed from the left; that did seem to be rather extraordinary. He wondered whether Professor Friel considered the right side did differ from the left or whether it was the median raphe which might be diverted a little to one side, or whether it was actually plumb centre.

Mr. H. G. Watkin said that with an upper molar the palatal root, as they well knew, was much larger than the two buccal roots, and therefore if one removed an E, for example, the pressure from the back would push the molar forward and it would rotate round the palatal root. He asked whether Professor Friel would agree with that.

Mr. R. O. Hellier said he was wondering whether Professor Friel had any records to show if they were right- or left-handed people.

Mr. Russell said that in determining measurements, even to within one degree, there were so many variable factors in a study of the nature described which had not been mentioned or taken into consideration that he did not think the figures given were statistically relevant. A mere millimetre in an anterior plane would make quite a difference in the degree of rotation to right or left. The figures produced were interesting, but there were so many variable factors, as the Chairman had pointed out; for example, the arches might be convergent or parallel and one side could be at a different angle from the other. Another point to consider was the distance of the raphe from each individual tooth, and that had not been mentioned.

Professor Friel, replying to the point about the age group of the extraction cases, said he thought probably it ranged from 5 to 9 years of age; the earlier the extraction the greater the rotation and forward movement of the tooth. The greatest rotation he had seen was 30 degrees to the raphe, which meant the median buccal cusp point and the distal lingual cusp point were parallel to the median raphe, but there were not many of those.

Were they right-handed or left-handed? He had, as a matter of fact, noted whether the medical students were right- or left-handed, but he had not the figures with him; he had not taken notes of the others. He did not think there was any connexion.

No Class II, division 2 or Class III's had been taken.

The reason for rotation was that the palatine root acted as a rudder, and when the tooth moved forward it would hold the rudder out. Years before, Professor Friel had collected a lot of first permanent molars and just slid them down into glass tubes that would hold them comfortably. He filled the glass tube with a thick, clear, viscous fluid and dropped the molars, one after the other, all going the same way, all dropped head foremost, into the fluid; they all rotated in the same way. If one did the opposite thing and put the roots forward they would rotate the opposite way. Those were the only teeth that were uniform in that method of rotation.

In regard to the shape of the arch, if one had a V-shaped arch the molar would be rotated naturally. That was why the post-normals were rotated more than the normals.

In thanking Professor Friel for his paper, the *Chairman* said that most people would know that Professor Friel was an authority on occlusion and the development of occlusion. There was very little he did not know about that subject. He had been interested in the rotation of molars for very many years.

DISTAL MOVEMENT OF PREMOLARS AND CANINES

By **J. ANGELMAN**, L.D.S.

ORTHODONTIC cases present themselves where the first permanent molars cannot be saved, or have recently been removed, and there exists:—

1. Generalized overcrowding in labial and buccal segments.

2. Overcrowding in either labial or buccal segments.

The problem is to retract the premolars so as to make room for the correction of part or the whole of the labial segments.

The following is a description of appliances designed to retract the premolar teeth and where necessary, the canine teeth, and guide them into the arch. This has to be achieved before the second permanent molars erupt, the

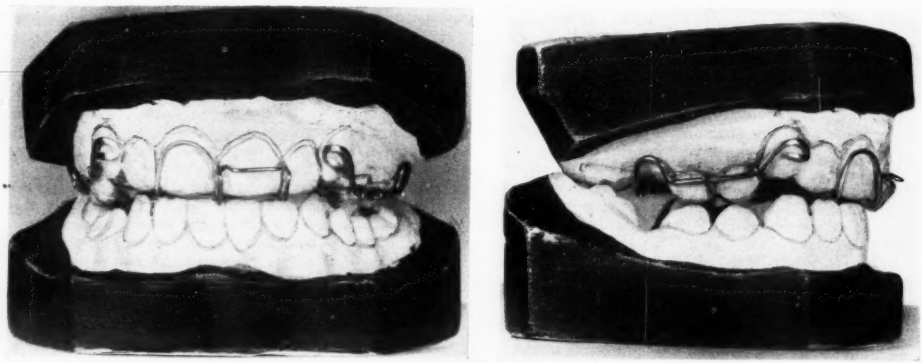


Fig. 1.—Demonstrates a frontal and lateral view of the appliance in situ, showing the mode of anchorage, the lateral arms acting as a guide and stabilizer to the premolar retraction springs, and as a canine retractor.

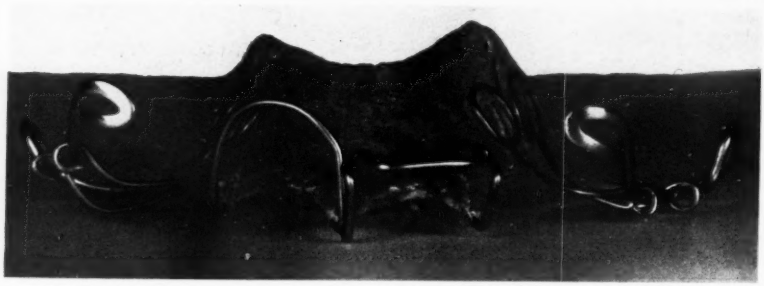


Fig. 2.—Shows a palatal view of the appliance with the coiled palatal springs.

3. Forward movement of buccal segments with insufficient room for the canines, which may be unerupted or in the process of eruption.

time factor being of importance, more especially in the maxillary arch where the second permanent molars rapidly occupy the position

A demonstration at the Jubilee Meeting held on May 10, 1958.

of the first permanent molars. If the distal movement of the premolars and canines is not achieved in time, overcrowding is maintained, which may necessitate the further loss of dental units.

Lateral Arms.—Two lateral arms constructed in 1·0 mm. wire extend from the distal aspect of the appliance, buccally to the canine area. The distal curve of the arm where it leaves the acrylic plate lies anterior to the area where the second molar will erupt. This can be assessed by inspection and where necessary by radiographs. If the tooth is erupting the curve will act as a space-maintainer to prevent forward movement, until the premolars and canines are retracted.

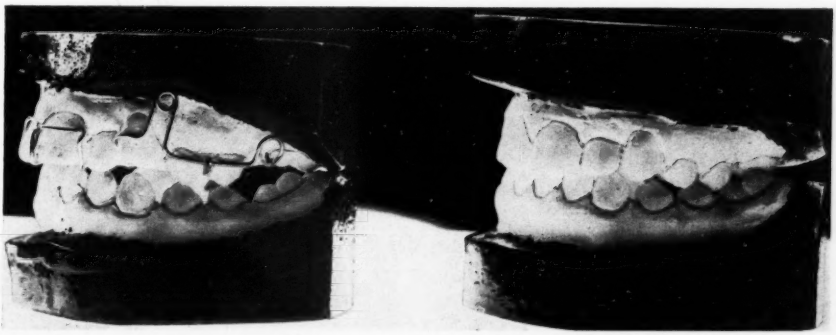


Fig. 3.—Shows a case being treated with the snatcher type modification of the lateral arms, the models on the right showing the final alinement of the buccal and labial segments.

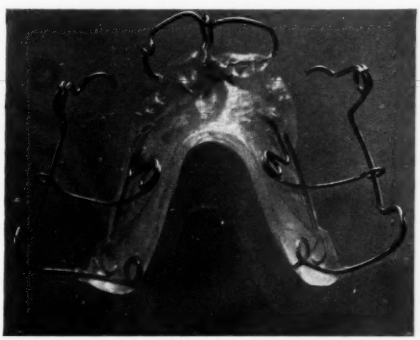


Fig. 4.—Shows a palatal view of the appliance used to detail the method of its construction.

Fig. 5.—Palatal view of the appliance used to illustrate the design of the premolar retraction springs.

The appliances and cases described below deal with the maxillary arch, but the principles apply equally well to the mandibular arch.

Anchorage.—This is obtained by clasping with Adams cribs or continuous cribs, or a combination of both:—

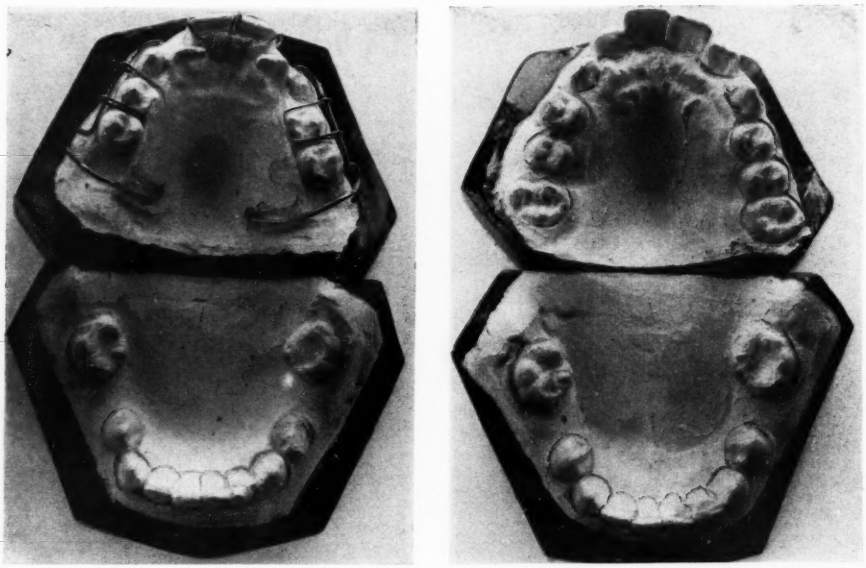
1. The central incisors.
2. Central incisor and lateral incisor.
3. Two lateral incisors.

The anchorage thus obtained is quite rigid, and is amply illustrated in the figures below.

The buccal extension of the arm has two functions:—

1. To act as a guide and stabilizer for the premolar retraction springs.
2. To retract the canine teeth when they are mesially inclined or erupting in labioversion.

To achieve this the free ends of the buccal arms are flattened and curved to embrace the mesial aspects of the crowns, and a U-loop (*Figs.* 3, 4) where it is constructed in 0·8 mm. wire, the free end designed as a snatcher type of canine retractor.



A B

Fig. 6.—Shows the case described in the text, (A) before, and (B) following treatment.

A B

Fig. 7.—Shows further modifications of the appliance showing the design of the premolar retraction springs and their method of attachment.

incorporated near the distal ends. Gentle closure of the loops will produce a distal pressure on the canine teeth (*Figs.* 1, 6). Modifications of the lateral arm can be employed

Premolar Retraction Springs.—Two 0·5 mm. wire extensions, coiled near their point of fixation into the palate, pass across the premolar teeth to exert pressure on their

mesial surfaces. Their free ends are coiled once round the lateral arms which act as a guide and stabilizer. In this way four premolars are moved simultaneously (*Figs.* 1, 2).

Several modifications of premolar retraction springs can be used. *Fig.* 4 shows a single retraction spring guided on the lateral arm and palatally by a wire extension. This can be employed to retract the premolars individually.

Figs. 5 and 6 show the design and construction of a double retraction spring from a single length of wire. The gradual closure of the palatal U-loop retracts the premolars simultaneously. In this case 2|2 were in linguoversion and excluded from the arch by the approximation of 31|13. *Fig.* 6 B shows the case following treatment in which 543|345 were moved distally by the appliance demonstrated in *Figs.* 5 and 6 A. 2|2 were subsequently re-alined into spaces made for them.

A further modification is illustrated in *Fig.* 7 B which shows two premolar retraction springs, the U-loops lying in apposition. The springs can be adjusted to move together, or at different pressures, or individually.

A METHOD OF TREATMENT IN ANGLE CLASS III MALOCCLUSIONS

By **C. P. BRIGGS**, B.D.S., D.D.O.

THE treatment of the Angle Class III malocclusion by orthodontic methods poses some of the most difficult problems in this field of dental surgery. The severity of the case may vary from a very mild edge-to-edge incisor relation, often associated with a postural element (Hopper, 1955), to gross conditions where only plastic surgery can be of value. It has been said that, where the degree of protrusion of the lower incisors in front of the uppers is more than 5 mm., operative treatment is called for (Haüpl, Grossman, and Clarkson, 1952). Fortunately the patient with a true Class III malocclusion occurs least often, 3 per cent of all malocclusions being a figure quoted (White, Gardiner, and Leighton, 1954).

It has been recognized that irregularities of this nature may be grouped into definite morphological types (McCallin, 1956), and, although a wide range of variation does occur, it is for one of these that a new method of treatment has been devised and used successfully.

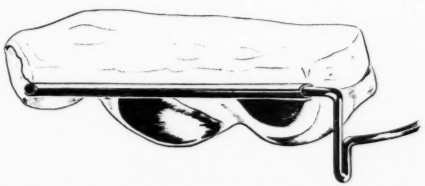


Fig. 1.—Showing silver-acrylic splints before fitting.

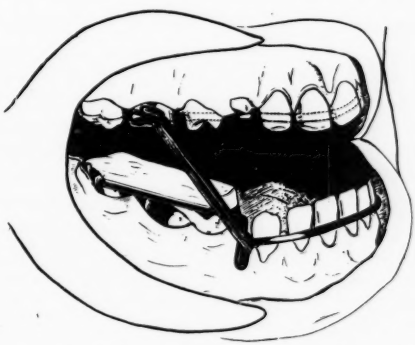


Fig. 2.—Showing completed appliance as worn in the mouth.

The method is applicable to those cases where there is a mild yet definite inferior basal prenormality in addition to the occlusal

A demonstration at the Jubilee Meeting held on May 10, 1958.

malrelation. The dental arches may or may not be mutilated by extractions. It is helpful, however, to deal with local irregularities, if severe, before applying this method of treatment.

Previously, treatment for these cases has usually been directed towards the advancement of the upper labial segment, either by means of fixed apparatus with fine wire auxiliary springs, simple reversed intermaxillary traction, or with removable screw and spring plates. The lower dental arch may be treated either by extractions or by means of extra-oral traction (Chapman, 1950). Occipito-mental anchorage such as that originally described for use with cleft lip and palate cases (Kettle and Burnapp, 1955) has also been used successfully.

The apparatus used in this method requires the construction of two cast silver splints which fit over all the erupted lower cheek teeth on each side and bear on their occlusal surfaces retention tags to retain acrylic. Providing there is no spacing between the lower teeth at the time of commencement of treatment, extraction of the lower first premolars is indicated. When the splints have been made, they are tried in the mouth. They should have wax blocks placed on their occlusal surfaces at this stage. These are reduced at the try-in until the posterior teeth are just sufficiently gagged to free the adverse incisor relation. There should be a short length of stainless steel tubing, 0·8 internal diameter, incorporated at the time of casting on to the buccal surfaces of each splint. To reduce the bulk of silver, the splints may be hollowed out occlusally.

After a try-in, the splints are returned to the laboratory and the wax blocks replaced by acrylic processed directly on to the retention tags (*Fig.* 1). A sliding facial bow is then adapted around the lower incisor teeth, hooks to receive intermaxillary elastics being incorporated in the region of each lower canine.

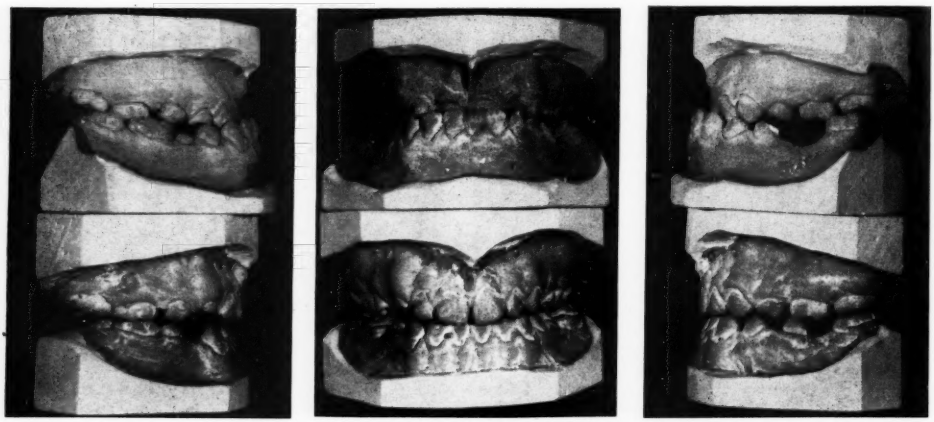


Fig. 3.—*Case* 1. Models showing results of treatment.

The upper first permanent molar teeth are banded and a hook soldered on to the buccal side of each band to receive the superior end of the intermaxillary elastics. The anchorage is stabilized by means of a palatal bow attached to each band (*Fig.* 2).

The action of this apparatus is two-fold:—

1. The silver-acrylic gags free the incisors and allow them to be correctly re-orientated with each other.

2. The intermaxillary elastics have a reciprocal action in retroclining the lower anterior teeth and stimulating a forward movement of the whole upper dental arch.

It has been found, on completion of treatment by this method, that, when the gags are

removed, some degree of posterior or lateral open bite may be present. Experience has shown, however, that when there is a gradual reduction in the height of the gags, followed by the removal of the entire splint, this open bite closes spontaneously.

CASE REPORTS

Case 1.—J. C., female, aged 15 years. This patient was seen to have a pre-normal occlusion, the lower incisors coming facially to the uppers on closing, without any posturing forward. Treatment by this method was considered to be suitable and $\overline{4|6}$ were extracted. The lower molar was removed rather than a premolar because of caries. When $\overline{|3}$ had been retracted sufficiently, it was observed that enough space had appeared between $\overline{|3}$ and $\overline{|4}$ to justify the commencement of treatment. In June, 1957, the apparatus was fitted and, by October, 1957, the incisor relationship was reversed (*Fig.* 3). The diagram (*Fig.* 2) shows the assembled apparatus during treatment.

Case 2.—D. M.-M., male, aged 9 years (Mr. J. H. Gardiner's patient).

In September, 1954, this case was examined and found to have a pre-normal occlusion such as that described above. There was an intact lower arch with spacing in the lower incisor region. The upper arch was well developed, although $\underline{E|ED}$ were missing. When the teeth were brought into occlusion the upper incisors bit well inside the lower arch.

In view of the spacing in the lower arch, no lower units were removed. Apparatus was fitted in September, 1954, and three months later the upper central incisors could be seen to be over the bite. Models taken in December, 1956 (*Fig.* 4), showed that this relationship had been retained. It was necessary, however, to fit a fixed palatal bow with fine wire springs to guide the erupting upper lateral incisors into correct position at a later date.

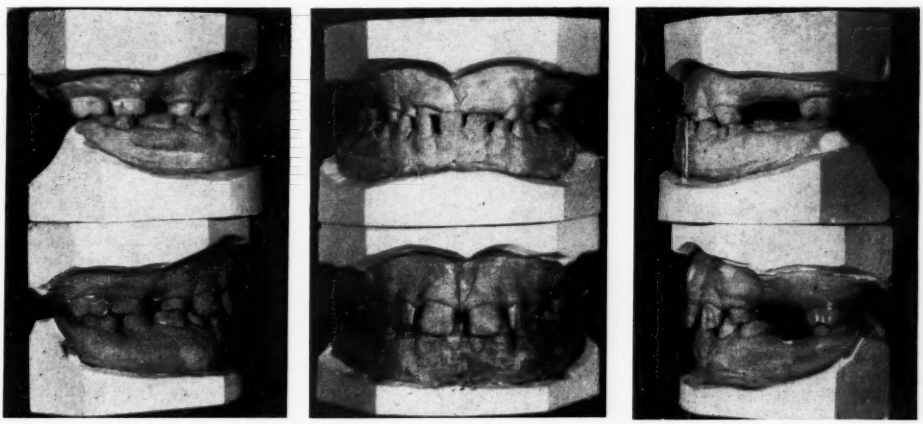


Fig. 4.—*Case* 2. Models showing results of treatment.

SUMMARY

A method is described for treating a certain type of Class III malocclusion, using fixed apparatus with silver-acrylic overlays. Two cases are described showing successful results obtained with this apparatus.

Acknowledgements.—My thanks are due to Professor G. L. Roberts of the University of Sheffield for permission to describe the two treated cases; to Mr. J. H. Gardiner for the initial work on this apparatus; to Mr. R. Cousins for the photographs; and to Mr. E. D. McBride of the Royal Dental Hospital for technical assistance in preparing the models used at the demonstration

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THE RUBBER PEG PLATE

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WITH the disappearance of hickory wood during the last world war the peg plate appears to have fallen into disuse. A modified form of peg plate has been used by the Orthodontic Department of the Edinburgh Dental Hospital since its introduction by Mr. J. D. Hamilton Jamieson.

The appliance is used mainly for the labial movement of lingually occluding upper incisors. It consists of an upper plate built up behind the incisors to form a flat biting plane (*Fig.* 1 A) level with the incisal edges of these teeth. The plate is extended over the occlusal surface of the cheek teeth, the so-called molar capping (*Fig.* 1 B), and retention is provided by the modified arrowhead (Adams) clasp usually on the upper first permanent molars. Technical points to note are the use of a stone model to reduce the risk of misfits due to crumbling of the cusps of the cheek teeth, and the plastering out of the mesial arms of the clasps where they pass over the occlusal aspect of the interproximal space to prevent the arms becoming embedded in the molar capping and so making the clasps too rigid. The distal arms of the clasp are left free of the molar capping.

FITTING THE APPLIANCE

The occlusal surface of the molar capping and the anterior biting plane are ground to the occlusion of the mandibular teeth and the bite closed until the lingually placed upper teeth just clear the lower incisors. If the bite is closed too far and the lower incisors overlap the upper, the bite must be opened again by the addition of quick-setting acrylic.

ACTIVATING THE APPLIANCE

With a No. 7 round bur drill a tunnel tapering from the fitting to the palatal surface of the plate opposite the tooth to be moved (*Fig.* 1 C). Countersink the orifice of the tunnel to accommodate the compressed rubber peg.

Take a length of Ash No. 4 separating rubber strip, trim one end to a point, tie a length of floss silk to the tapered end and pass the floss silk through the tunnel pulling the rubber strip through from the fitting to the palatal surface (*Fig.* 1 D), leaving about 1 mm.

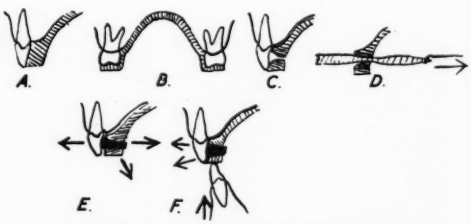

Fig. 1.—A, Anterior bite plane; B, Molar capping; C, Tunnel for rubber peg; D, Method of inserting rubber peg; E, Slight displacement of plate due to "back thrust" of peg; F, Countering of back thrust and increase of forward force due to biting of lower incisors on the bite plane (for fuller details *see* text).

projecting from the fitting surface. Holding the excess rubber strip under tension, cut it off flush with the palatal surface, thus avoiding a projection of the strip; if a flush cut is not achieved the projecting end can be trimmed flush with a carborundum stone. The diameter of the tunnel is made less than the width of the rubber strip, which is pulled through under tension and therefore elongated and narrowed. The compressed part of the strip in the tunnel exerts a lateral pressure and the peg is thus held in place.

When the appliance is inserted the force generated by the compression of the projecting rubber peg between the plate and the tooth is exerted partly in a forward direction against the tooth and partly backwards, causing a slight downward and backward displacement of the anterior end of the plate (*Fig.* 1 E).

When the teeth are occluded in eating and swallowing this backthrust is countered by the occlusal force of the lower incisors on the

Based on a demonstration given at the Jubilee Meeting held on May 10, 1958.

biting plane, thus momentarily increasing the forward force on the tooth (*Fig.* 1 F). This biting of the plate up and the following relaxation induces a "bounciness" into the plate which the children do not appear to mind; they are of course warned about the sensation. If a child appears uncertain when the appliance is fitted, he is allowed to wear the appliance for a week to gain confidence before the peg is inserted.

The peg is changed at intervals of 2–3 weeks, a slightly longer peg being inserted at each visit. The average duration of treatment to move an incisor over the bite is 6–8 weeks. The rubber peg may be used to open up space between adjacent teeth, a double-ended peg being used (*Fig.* 2). Rubber pegs can be used in an Andresen or Monobloc to assist the labial movement of the lower incisors or the buccal movement of cheek teeth.

While it is not claimed that the appliance is superior to other methods of achieving the same ends, it has the merit of simplicity of construction and the peg is not susceptible to distortion or breakage.

Two cases illustrating the use of the appliance are shown in *Fig.* 2. *Fig.* 2 A shows the use of the double rubber peg to open up space for a surgically exposed $\underline{1}|$ following removal of the midline supernumerary. *Fig.* 2 B shows the treatment of lingually occluding $\underline{1}|\underline{1}$ in two stages. First the labial movement of $|\underline{1}$ (lower appliance) followed by the labial movement and rotation of $\underline{1}|$ (upper appliance on model). The rubber peg was directed against the distopalatal surface of $\underline{1}|$ and a labial arm was adapted to bear on the mesiolabial surface to effect the rotation.

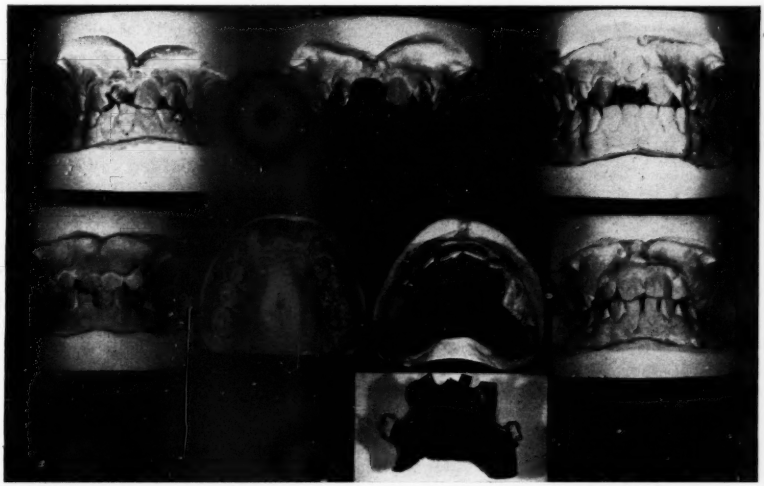

Fig. 2.—A, Double rubber peg used to open up space for unerupted $\underline{1}|$ after extraction of midline supernumerary; B, Rubber pegs used to correct lingually occluding $\underline{1}|\underline{1}$ in two stages:—1, Labial movement of $|\underline{1}$ (lower appliance); 2, Labial movement and rotation of $\underline{1}|$ (upper appliance incorporating a spring arm labially to bear on mesiolabial corner of $\underline{1}|$).

Acknowledgements.—It is desired to make full acknowledgement to Mr. J. D. Hamilton Jamieson as the originator of the appliance.

I wish to thank my colleagues, Mr. D. A. Dixon and Mr. D. M. Menezes, for two of the clinical cases used in the demonstration; I would also like to thank Mr. W. Duncan and Mr. G. Richardson for the construction of the demonstration and Mr. D. C. Standen for the photographs.

ABSTRACTS FROM OTHER JOURNALS

Cyclopropane in a Non-explosive Mixture for Out-patients' Anæsthesia

The commonest anæsthesia for minor operations in this country is nitrous oxide. Inexpert administration often results in hypoxia, the dangers of which are well recognized.

The fundamental disadvantage of nitrous oxide is its low anæsthetic potency. Any attempt to deepen anæsthesia inevitably introduces hypoxia.

Cyclopropane, however, is an anæsthetic which has desirable qualities in this connexion, since its potency allows full oxygenation while the speed of induction and of recovery is attractive for ambulant patients.

The Hingson apparatus which permits cyclopropane from special midget cylinders to be administered in a non-explosive mixture with helium and oxygen is described.

The clinical results of this method in 100 cases were so good as to engender the hope that an apparatus of this sort would be more widely available for trial in this country.—MUSHIN, W. W., and THOMPSON, P. W. (1958), *Brit. med. J.*, **1**, 1376.

Treatment of Bell's Palsy

The treatment is according to two distinct groups; first those in which the paralysis is of a transitory nature, and secondly those in which it is profound, offering prolonged resistance to treatment. It is observed that in the first group the patients have a normal dentition and bite or are wearing upper and lower dentures with correct bite opening, whereas in the second group the patients have lost their posterior teeth or are wearing dentures with a markedly closed bite. The treatment for the second group of patients is as follows:—

1. During the acute stage: (*a*) Warmth, massage, and short-wave diathermy; (*b*) Eye-shield.
2. Galvanism and massage.
3. New dentures with correct opening of bite.
4. Attachment of an intra-oral lip support for: (*a*) Psychological relief; (*b*) Muscles are held in relaxed position; (*c*) It is possible to watch the progress of the condition.—BOOTH, JAMES (1958), *Brit. med. J.*, **2**, 978.

A Contribution to the Mycology of the Mouth

Fungi of many types can be isolated both from normal mouths and from mouths showing various disorders, in some of which fungi have often been regarded as the causal agents. Recently particular attention has been paid to mycotic infections of the oral cavity as a complication of antibiotic therapy. Conditions which showed no distinctive mycological findings were lichen planus, lupus erythematosus disseminatus, leucoplakia, fungating antrum carcinoma, and dry socket. Conditions which showed distinctive mycological findings were angular cheilosis, gingivostomatitis, lingua nigra, lingua geographica, coated tongue, and denture sore mouth. *Candida albicans* seems to play a primary part in the aetiology of angular cheilosis and some conditions of gingivostomatitis.—FOX, E. C., and AINSWORTH, G. C. (1958), *Brit. med. J.*, **2**, 826.

Early Treatment and the Interception of Malocclusion

Methods of early treatment and interception for four types of developmental problems are discussed. The four types of problems are: (1) Functional shifts of the mandible which result in cross-bites and in-lockings; (2) Dental anomalies and their associated growth disorders; (3) Oral habits and their control; and (4) The problems of space management.

The control or removal of these problems is indicated at any age whenever they occur in the growing dentition. Although malocclusion cannot always be prevented, its intensity can be reduced. Furthermore, the teeth are permitted to grow and adjust without interference from local developmental disorders.—CHENEY, E. A. (1958), *J. Mich. St. dent. Assoc.*, **40**, 102.